


Subject Categories of the Division A. Aeronautics

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

- | | | |
|-----------|--|-------------|
| 01 | Aeronautics (General) | 1 |
| 02 | Aerodynamics | 2 |
| | Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery. For related information, see also <i>34 Fluid Mechanics and Heat Transfer</i> . | |
| 03 | Air Transportation and Safety | 5 |
| | Includes passenger and cargo air transport operations; and aircraft accidents. For related information, see also <i>16 Space Transportation</i> and <i>85 Urban Technology and Transportation</i> . | |
| 04 |  Aircraft Communications and Navigation | 6 |
| | Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control. For related information, see also <i>17 Space Communications, Spacecraft Communications, Command and Tracking</i> and <i>32 Communications Radar</i> . | |
| 05 | Aircraft Design, Testing and Performance | 9 |
| | Includes aircraft simulation technology. For related information, see also <i>18 Spacecraft Design, Testing and Performance</i> and <i>39 Structural Mechanics</i> . For land transportation vehicles, see <i>85 Urban Technology and Transportation</i> . | |
| 06 | Aircraft Instrumentation | N.A. |
| | Includes cockpit and cabin display devices; and flight instruments. For related information, see also <i>19 Spacecraft Instrumentation</i> and <i>35 Instrumentation and Photography</i> . | |
| 07 | Aircraft Propulsion and Power | 11 |
| | Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft. For related information, see also <i>20 Spacecraft Propulsion and Power</i> , <i>28 Propellants and Fuels</i> , and <i>44 Energy Production and Conversion</i> . | |
| 08 | Aircraft Stability and Control | N.A. |
| | Includes aircraft handling qualities; piloting; flight controls; and autopilots. For related information, see also <i>05 Aircraft Design, Testing and Performance</i> . | |
| 09 | Research and Support Facilities (Air) | 12 |
| | Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands. For related information, see also <i>14 Ground Support Systems and Facilities (Space)</i> . | |

Subject Categories of the Division B. Astronautics

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

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|-----------|---|-------------|
| 12 | Astronautics (General) | 13 |
| | For extraterrestrial exploration, see <i>91 Lunar and Planetary Exploration</i> . | |
| 13 | Astrodynamics | N.A. |
| | Includes powered and free-flight trajectories; and orbital and launching dynamics. | |
| 14 | Ground Support Systems and Facilities (Space) | 13 |
| | Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators. <i>For related information, see also 09 Research and Support Facilities (Air).</i> | |
| 15 | Launch Vehicles and Space Vehicles | 14 |
| | Includes boosters; operating problems of launch/space vehicle systems; and reusable vehicles. <i>For related information, see also 20 Spacecraft Propulsion and Power.</i> | |
| 16 | Space Transportation | 15 |
| | Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques. <i>For related information, see also 03 Air Transportation and Safety and 18 Spacecraft Design, Testing and Performance. For space suits, see 54 Man/System Technology and Life Support.</i> | |
| 17 | Space Communications, Spacecraft Communications, Command and Tracking | N.A. |
| | Includes telemetry; space communication networks; astronavigation and guidance; and radio blackout. <i>For related information, see also 04 Aircraft Communications and Navigation and 32 Communications and Radar.</i> | |
| 18 | Spacecraft Design, Testing and Performance | 16 |
| | Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls. <i>For life support systems, see 54 Man/System Technology and Life Support. For related information, see also 05 Aircraft Design, Testing and Performance, 39 Structural Mechanics, and 16 Space Transportation.</i> | |
| 19 | Spacecraft Instrumentation | 17 |
| | <i>For related information, see also 06 Aircraft Instrumentation and 35 Instrumentation and Photography.</i> | |
| 20 | Spacecraft Propulsion and Power | 17 |
| | Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. <i>For related information, see also 07 Aircraft Propulsion and Power, 28 Propellants and Fuels, 44 Energy Production and Conversion, and 15 Launch Vehicles and Space Vehicles.</i> | |

Subject Categories of the Division C. Chemistry and Materials

Select a category to view the collection of records cited. N.A. means no abstracts in that category.

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|-----------|---|-----------|
| 23 | Chemistry and Materials (General) | 18 |
| 24 | Composite Materials | 19 |
| | Includes physical, chemical, and mechanical properties of laminates and other composite materials. For ceramic materials see <i>27 Nonmetallic Materials</i> . | |
| 25 | Inorganic and Physical Chemistry | 22 |
| | Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry. For related information see also <i>77 Thermodynamics and Statistical Physics</i> . | |
| 26 | Metallic Materials | 26 |
| | Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy. | |
| 27 | Nonmetallic Materials | 33 |
| | Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see <i>24 Composite Materials</i> . | |
| 28 | Propellants and Fuels | 43 |
| | Includes rocket propellants, igniters and oxidizers; their storage and handling procedures; and aircraft fuels. For related information see also <i>07 Aircraft Propulsion and Power</i> , <i>20 Spacecraft Propulsion and Power</i> , and <i>44 Energy Production and Conversion</i> . | |
| 29 | Materials Processing | 44 |
| | Includes space-based development of products and processes for commercial application. For biological materials see <i>55 Space Biology</i> . | |

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS

A Biweekly Publication of the National Aeronautics and Space Administration

VOLUME 36, JANUARY 19, 1998

01 AERONAUTICS (GENERAL)

19980002685 General Accounting Office, Accounting and Information Management Div., Washington, DC USA

Report to the Secretary of Defense. Financial Management: DOD's Liability for Aircraft Disposal Can Be Estimated

Nov. 1997; 22p; In English

Report No.(s): GAO/AIMD-98-9; B-273004; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In October 1990, the Federal Accounting Standards Advisory Board (FASBO) was established by the Secretary of the Treasury, the Director of The Office of Management and Budget (OMB), and the Comptroller General of the USA to consider and recommend accounting standards to address the financial and budgetary information needs of the Congress, executives agencies, and other users of federal financial information. Using a due process and consensus building approach, the nine-member Board, which has since its formation included a member from DOD, recommends accounting standards for the federal government. Once FASAB recommends accounting standards, the Secretary of the Treasury, the Director of OMB, and the Comptroller General decide whether to adopt the recommended standards.

Author

Financial Management; USA; Accounting

19980003809 National Aerospace Lab., Tokyo, Japan

NAL Research Progress, 1995

Abe, M., National Aerospace Lab., Japan; Nayuki, T., National Aerospace Lab., Japan; Yoshida, M., National Aerospace Lab., Japan; Matsuo, Y., National Aerospace Lab., Japan; Mar. 29, 1996; 127p; In English; Original contains color illustrations

Report No.(s): PB96-213806; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The report presents: Research Highlights in the areas of: Computational and Experimental Aerodynamics; Materials and Structures; Control and Guidance; Aircraft Propulsion; Space Propulsion and Transportation System; Space Technology and Application; and Research Activities.

NTIS

Aerospace Engineering; Computational Fluid Dynamics; Technology Utilization; Aircraft Engines

19980003810 Nanjing Univ. of Aeronautics and Astronautics, Nanjing, Jiangsu, China

Journal of Nanjing University of Aeronautics and Astronautics, Volume 28

Jun. 1996; 152p; In Chinese; Portions of this document are not fully legible; See also PB96-156583.

Report No.(s): PB96-214010; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Topics considered include: Integrated Optimization of Aircraft Aerodynamic Performance and Radar Cross Section; Some Problems on Aerodynamic Configuration for the Single-Rotor Helicopter; Experimental Study of Flow Induced Cavity Oscillation and Its Suppression by Sound Excitation; Experimental Study of the Performance of an Ejector with a Non-Axisymmetrically Lobed Nozzle; and An On-Line Holographic Method for Measurement of Particle Distribution of an Atomized Rotating Field.

NTIS

Aircraft Performance; Research and Development

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery. For related information see also 34 Fluid Mechanics and Heat Transfer.

19980002478 National Aerospace Lab., Aerodynamics Div., Amsterdam, Netherlands

Computation of the Flow about a F16-Like Configuration for Several Flow Conditions

vandenBerg, J. I., National Aerospace Lab., Netherlands; Sytsma, H. A., National Aerospace Lab., Netherlands; Schippers, H., National Aerospace Lab., Netherlands; Apr. 4, 1995; 18p; In English; 13th; AIAA Applied Aerodynamic Conference, 19-22 Jun. 1995, San Diego, CA, USA

Report No.(s): PB97-193270; NLR-TP-95226-U; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

At NLR a CFD technology readiness program has been carried out to demonstrate that current CFD knowledge and capabilities are advanced to such a level that NLR can support air forces by giving advice with regard to aerodynamic matters related to the operational use of military aircraft. As a representative test case the flow field about a F16-like configuration is computed for several flow conditions including engine power settings. The results as obtained with the computational method based on the Euler equations show that the main flow features such as vortices developing at the strake and the wing tip as well as the complex shock structure above the wing are captured quite well. Detailed load distributions as represented by comparison of computed and measured pressure distributions over the wing, body and horizontal tail plane, indicate that the accuracy of the results is satisfactory for the conditions under consideration. Small differences are attributed to the absence of viscous terms in the Euler method. In order to investigate these viscous effects a method based on some form of the Navier-Stokes equations should be taken into account.

NTIS

F-16 Aircraft; Computational Fluid Dynamics; Flow Distribution; Horizontal Tail Surfaces; Navier-Stokes Equation

19980002572 Tsentralni Aerogidrodinamicheskii Inst., Moscow, USSR

Investigation of Relaxation Processes in Flow about Models in Hypersonic Wind Tunnels of Different Types *Final Report*

Alfyorov, Vadim, Tsentralni Aerogidrodinamicheskii Inst., USSR; Shcherbakov, G. I., Tsentralni Aerogidrodinamicheskii Inst., USSR; Rudakova, A. P., Tsentralni Aerogidrodinamicheskii Inst., USSR; Yegorov, I. V., Tsentralni Aerogidrodinamicheskii Inst., USSR; Skirda, V. N., Tsentralni Aerogidrodinamicheskii Inst., USSR; Jan. 1994; 72p; In English

Contract(s)/Grant(s): F61708-93-W-0695

Report No.(s): AD-A324560; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This report presents the theoretical and experimental results related to flows over such simple bodies as semisphere, cone, and wedge. These were investigated in hypersonic wind tunnels of various classes at nearly equal Mach and Reynolds numbers (M from 7.0 to 8.0, Re(o) from 135 to 240) but at notably different free-stream velocities: 790, 2700 and 6000 m/s. Hypersonic resistance and arc-heating wind tunnels and a hypersonic MHD-accelerator wind tunnel, as well as their test equipment are described. A technique to determine parameters of a free stream over a model including gasdynamic ones (M, Re, Re(o), T, P, V, Ho, H) and physico-chemical ones (gamma To, Tv, Tn, Ci), as well as a verification procedure are presented. Experimental data on pressure distribution over models, shock wave positions/shapes were obtained. The experimental data are compared with respective calculated results obtained by using the VSL theory and the Navier-Stokes equations for the test conditions adopted. Interrelation of the theoretical and test data is shown not to be unambiguous, especially in what concerns locations and shapes of shock waves. The VSL theory is employed to compute local parameters of the shock layer. The influence of alkali metal seed on the rate of relaxation in the shock-layer is considered. Features of profiles of both temperature and air component concentrations in the shock layer are shown to be useful in explaining a set of phenomena revealed in experiments: a radiation offset upstream of a sphere hypervelocity shock layer, a radiation relaxation at a cone apex. The impact of the seed metal is shown to be insignificant.

DTIC

Wind Tunnel Models; Reynolds Number; Resistance Heating; Physical Chemistry; Navier-Stokes Equation; Magnetohydrodynamics; Mach Number; Hypersonic Wind Tunnels

19980002715 NASA Langley Research Center, Hampton, VA USA

Internal Performance of a Fixed-Shroud Nonaxisymmetric Nozzle Equipped with an Aft-Hood Exhaust Deflector

Asbury, Scott C., NASA Langley Research Center, USA; Nov. 1997; 74p; In English

Contract(s)/Grant(s): RTOP 522-25-31-15

Report No.(s): NASA/TM-97-206255; NAS 1.15:206255; L-17664; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

An investigation was conducted in the model preparation area of the Langley 16-Foot Transonic Tunnel to determine the internal performance of a fixed-shroud nonaxisymmetric nozzle equipped with an aft-hood exhaust deflector. Model geometric parameters investigated included nozzle power setting, aft-hood deflector angle, throat area control with the aft-hood deflector deployed, and yaw vector angle. Results indicate that cruise configurations produced peak performance in the range consistent with previous investigations of nonaxisymmetric convergent-divergent nozzles. The aft-hood deflector produced resultant pitch vector angles that were always less than the geometric aft-hood deflector angle when the nozzle throat was positioned upstream of the deflector exit. Significant losses in resultant thrust ratio occurred when the aft-hood deflector was deployed with an upstream throat location. At each aft-hood deflector angle, repositioning the throat to the deflector exit improved pitch vectoring performance and, in some cases, substantially improved resultant thrust ratio performance. Transferring the throat to the deflector exit allowed the flow to be turned upstream of the throat at subsonic Mach numbers, thereby eliminating losses associated with turning supersonic flow. Internal throat panel deflections were largely unsuccessful in generating yaw vectoring.

Author

Wind Tunnel Tests; Exhaust Nozzles; Deflectors

19980002796 Notre Dame Univ., Dept. of Aerospace and Mechanical Engineering, IN USA

An Experimental Investigation of the Confluent Boundary Layer on a High-Lift System *Final Report*

Thomas, F. O., Notre Dame Univ., USA; Nelson, R. C., Notre Dame Univ., USA; 1997; 54p; In English

Contract(s)/Grant(s): NAG2-905

Report No.(s): NASA/CR-97-112979; NAS 1.26:112979; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

This paper describes a fundamental experimental investigation of the confluent boundary layer generated by the interaction of a leading-edge slat wake with the boundary layer on the main element of a multi-element airfoil model. The slat and airfoil model geometry are both fully two-dimensional. The research reported in this paper is performed in an attempt to investigate the flow physics of confluent boundary layers and to build an archival data base on the interaction of the slat wake and the main element wall layer. In addition, an attempt is made to clearly identify the role that slat wake / airfoil boundary layer confluence has on lift production and how this occurs. Although complete LDV flow surveys were performed for a variety of slat gap and overhang settings, in this report the focus is on two cases representing both strong and weak wake boundary layer confluence.

Author

Airfoils; Leading Edges; Two Dimensional Boundary Layer; Trailing Edges; Vortex Flaps; Flow Characteristics; Flow Coefficients

19980002818 Technische Univ., Faculty of Applied Mathematics, Twente, Netherlands

Instabilities of Stationary Inviscid Compressible Flow Around an Airfoil

Vanbuuren, R., Technische Univ., Netherlands; Kuerten, J. G. M., Technische Univ., Netherlands; Geurts, B. J., Technische Univ., Netherlands; Dec. 1996; ISSN 0169-2690; 35p; In English; Figures in this document may not be legible in mic

Report No.(s): PB97-181614; MEMO-1360; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

In the paper, the authors numerically solve the stationary inviscid flow around an airfoil. An analysis of the limiter shows that it is possible to obtain a machine accurate solution with an asymmetric minmod limiter if an implicit scheme with low CFL number is used. For higher CFL number, the convergence rate of this scheme increases considerably at the expense of a strong increase in the final residual level. A further study of the differences revealed that the steady state obtained with the implicit method is in fact unstable and can only be found due to the dissipation present in the implicit method. The stall in convergence with the explicit method is caused by a physical instability in the wake behind the airfoil. This instability is also predicted by linear stability theory and confirmed by a grid refinement study.

NTIS

Airfoils; Compressible Flow; Inviscid Flow; Flow Equations; Asymmetry; Computational Grids

19980003319 Technische Univ., Faculty of Aerospace Engineering, Delft, Netherlands

Main Rotor Disc Edge Vortices: An Analytical Model

Roos, J. P., Technische Univ., Netherlands; Dec. 1996; 83p; In English

Report No.(s): PB97-190169; MEMO-731; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This graduation report presents an analytical model for the disc edge vortices behind the helicopter main rotor. The model has been developed to come to a better understanding of the formation of these vortices and to be able to simulate their influence

on helicopter behavior during low speed flight. The model represents a first step into the direction of a more general model, capable of predicting the influence of main rotor/tail rotor interaction on helicopter stability and control.

NTIS

Helicopters; Wing Tip Vortices; Wakes; Stability; Mathematical Models; Rotary Wings; Tail Rotors; Blade-Vortex Interaction

19980003339 Toledo Univ., Dept. of Mechanical, Industrial and Manufacturing Engineering, OH USA

Aeroelastic Analysis of Counter Rotation Fans Final Report, 1 Sep. 1986 - 31 Dec. 1993

Keith, Theo G., Jr., Toledo Univ., USA; Murthy, Durbha V., Toledo Univ., USA; Dec. 1997; 6p; In English

Contract(s)/Grant(s): NAG3-742

Report No.(s): NASA/CR-97-112951; NAS 1.26:112951; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Aeroelastic problems in turbomachinery and propfans can be static or dynamic in nature. The analysis of static aeroelastic problems is involved primarily with determination: (a) of the shape of the blades and the steady aerodynamic loads on the blades (which are inter-dependent), (b) of the resultant steady stresses and (c) of the static instability (divergence) margin, if applicable. In this project, we were concerned exclusively with dynamic aeroelastic behavior. The analysis of dynamic aeroelastic problems is involved with the determination: (a) of the unsteady aerodynamic loads on blades and the dynamic motion of the blades (which are again inter-dependent), (b) of the resultant dynamic stresses and their effect on fatigue life and (c) of the dynamic instability (flutter), if applicable. There are two primary dynamic aeroelastic phenomena of interest to designers of turbomachinery and propfans: flutter and forced response. Flutter generally refers to the occurrence of rapidly growing self-excited oscillations leading to catastrophic failure of the blade. When certain nonlinear phenomena are present, flutter response may lead to a potentially dangerous limit cycle oscillation rather than an immediate catastrophic failure. Forced response generally refers to the steady-state oscillations that occur as a consequence of excitations external to the rotor in question. These excitations typically result from the presence of upstream obstructions, inflow distortions, downstream obstructions, or mechanical sources such as tip-casing contact or shaft and gear meshing. Significant forced response leads to blade fatigue, and at design conditions, generally contributes to a degradation of blade life. At other operating conditions, forced response may lead to catastrophic failure due to severe blade fatigue in a short duration of time.

Derived from text

Aeroelasticity; Turbomachinery; Counter Rotation; Dynamic Characteristics; Aerodynamic Loads; Flutter; Prop-Fan Technology; Fatigue Life

19980003829 National Aerospace Lab., Tokyo, Japan

Suspending Wind-Tunnel Test for the ALFLEX Vehicle

1996; 29p; In Japanese; Portions of this document are not fully legible; See also N92-28152 and PB97-136006.

Report No.(s): PB97-141105; NAL-TR-1306; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

A suspending wind-tunnel test for the Automatic Landing Flight Experiment (ALFLEX) was conducted as part of the research on an unmanned winged re-entry vehicle (HOPE). The suspending flight was simulated in the wind-tunnel using a 40% scaled model of the ALFLEX vehicle to validate the design of the suspending system and to identify the aerodynamic characteristics of the vehicle for designing a control system. As a result, problems of some elements of the system are identified and a counter-plan is considered. The flight test plan of AFLEX is then fixed based on these results.

NTIS

Automatic Landing Control; Reentry Vehicles; Wind Tunnel Tests; Aircraft Models

19980003841 McDonnell-Douglas Corp., Advanced Transport Aircraft Systems, Long Beach, CA USA

Aeroelastic Analysis of Aircraft: Wing and Wing/Fuselage Configurations

Chen, H. H., McDonnell-Douglas Corp., USA; Chang, K. C., McDonnell-Douglas Corp., USA; Tzong, T., McDonnell-Douglas Corp., USA; Cebeci, T., McDonnell-Douglas Corp., USA; May 1997; 66p; In English

Contract(s)/Grant(s): NAS2-14091

Report No.(s): NASA/CR-97-113008; NAS 1.26:113008; MDC-97K0164; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

A previously developed interface method for coupling aerodynamics and structures is used to evaluate the aeroelastic effects for an advanced transport wing at cruise and under-cruise conditions. The calculated results are compared with wind tunnel test data. The capability of the interface method is also investigated for an MD-90 wing/fuselage configuration. In addition, an aircraft trim analysis is described and applied to wing configurations. The accuracy of turbulence models based on the algebraic eddy

viscosity formulation of Cebeci and Smith is studied for airfoil flows at low Mach numbers by using methods based on the solutions of the boundary-layer and Navier-Stokes equations.

Author

Aerodynamics; Aeroelasticity; Wings; Aerodynamic Configurations; Turbulence Models; Mach Number; Navier-Stokes Equation; Computational Fluid Dynamics; Finite Element Method

03

AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents. For related information see also 16 Space Transportation and 85 Urban Technology and Transportation.

19980002428 Federal Aviation Administration, Aviation Security Human Factors, Atlantic City, NJ USA

Test and Evaluation Plan for Airport Demonstration of Computer-Based Training for Checkpoint Operations *Final Report*

Neiderman, E. C., Federal Aviation Administration, USA; Aug. 1996; 92p; In English

Report No.(s): PB97-169312; DOT/FAA/AR-96/09; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This document is the Test and Evaluation Plan (TEP) to evaluate the effectiveness of a Computer-Based Training (CBT) system to enhance screener performance to detect threat objects at the checkpoint. The test and evaluation (T&E) will determine the effectiveness of the CBT to meet the requirements set in the Critical Operational Issues and Criteria (COICs) and Additional Evaluation Issues and Criteria (AEICs). The testing will be conducted at 10 U.S. airports and the results will be analyzed and published in a test report.

NTIS

Computer Assisted Instruction; X Ray Detectors; Airports; Security; Explosives

19980002955 National Transportation Safety Board, Washington, DC USA

National Transportation Safety Board Aircraft Accident Report: In-Flight Icing Encounter and Loss of Control, Simmons Airlines, d.b.a. American Eagle Flight 4184 Avions de Transport Regional (ATR) Model 72-212, N401AM Roselawn, Indiana, Volume 2, Response of Bureau Enquetes-Accidents to Safety Board's Draft Report

Jul. 09, 1996; 338p; In English

Report No.(s): PB96-910402; NTSB/AAR-96/02; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Volume II contains the comments of the Bureau Enquetes-Accidents on the Safety Board's draft of the accident report. The comments are provided in accordance with Annex 13 to the Convention on International Civil Aviation. Volume I of this report explains the crash of American Eagle flight 4184, an ATR 72 airplane during a rapid descent after an uncommanded roll excursion. The safety issues discussed in the report focused on communicating hazardous weather information to flightcrews, Federal regulations on aircraft icing and icing certification requirements, the monitoring of aircraft airworthiness, and flightcrew training for unusual events/attitudes.

NTIS

Aircraft Accidents; Aircraft Icing; Aircraft Accident Investigation

19980003343 Federal Aviation Administration, Aviation Security Human Factors, Atlantic City, NJ USA

Test and Evaluation Plan for Airport Demonstration of Selection Tests for X-ray Operators *Final Report*

Neiderman, E. C., Federal Aviation Administration, USA; May 1997; 71p; In English

Report No.(s): PB97-176457; DOT/FAA/AR-97/29; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The document discusses the Test and Evaluation Plan (TEP) to evaluate the effectiveness of selection tests to hire screener job candidates who possess the ability to detect threat objects at the checkpoint. The test and evaluation (T&E) will determine the effectiveness of the selection tests to meet the requirements set in the Critical Operational Issues and Criteria (COICs) and Additional Evaluation Issues and Criteria (AEICs). The testing will be conducted at major U.S. airports and the results will be analyzed and published in a test report.

NTIS

Airport Security; Airline Operations; X Ray Inspection

19980003415 NERAC, Inc., Tolland, CT USA

Air Traffic Congestion and Capacity: (Latest citations from the NTIS Bibliographic Database)

Feb. 1997; In English; Page count unavailable. Supersedes PB96-851860

Report No.(s): PB97-856199; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning airport traffic density, congestion, and capacity. Included are flow control, enroute metering, queuing, scheduling, and airport regulations. Air traffic density models and studies of the National Airspace Plan, relating to forecast density and capacity requirements, are also included. The studies cover air carrier, helicopter, short haul feeder, and general aviation operations. Some studies pertain to the improvement of airport facilities, such as additional runway construction, landside operations, and terminal air traffic control procedures, equipment, and training. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Air Traffic

19980003420 Army Safety Center, Fort Rucker, AL USA

Flightfax, Volume 26

Oct. 1997; 12p; In English

Report No.(s): AD-A330063; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This periodical deals with all aspects of of army aviation. In this issue the emphasis is placed on the recent mishaps. In the last few months, a number of mishaps involving aircraft parts separating during flight.

DTIC

Aircraft Accidents; Aircraft Equipment; Aircraft Safety

04

AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control. For related information see also 17 Space Communications, Spacecraft Communications, Command and Tracking and 32 Communications and Radar.

19980002377 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Inst. of Flight Guidance, Brunswick, Germany

From Sensors to Situation Assessment Vom Sensor zur Situationserkennung

Fuerstenau, Norbert, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; From Sensors to Situation Assessment; 1996; ISSN 0939-298X; 211p; In English; In German; From Sensors to Situation Assessment, 3-4 May 1995, Braunschweig, Germany; Also announced as 19980002378 through 19980002389

Report No.(s): DLR-MITT-96-02; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

The proceedings of a conference entitled "From Sensors to Situation Assessment" is presented. The seminar concentrated primarily on tools and components which are required for assessing the traffic situation in airport ground traffic management systems. Most contributions in this seminar are based on work performed at the Institute of Flight Guidance. They were complemented by lectures from external experts, which are of special interest with respect to SMGCS. The seminar consisted of four sessions which covered the general aspects of ground movement management systems, the sensors for acquiring traffic data, tools and strategies for automatic traffic situation modelling and planning, and man-machine interfaces for interaction of the automatic system with the human operator. This current volume collects in four sections the twelve papers presented in the corresponding four sessions of the colloquium.

Derived from text

Conferences; Airports; Sensors; Human-Computer Interface; Management Systems; Traffic Control; Automatic Control; Airfield Surface Movements

19980002378 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Inst. of Flight Guidance, Brunswick, Germany

Situation Modelling as Applied to Airport Ground Traffic

Winter, Heinz, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; From Sensors to Situation Assessment; 1996, pp. 13-21; In English; Also announced as 19980002377; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

The functional structure of airport ground traffic management is analysed and described as a network of coupled work systems. In these work systems human operators (air traffic controllers, pilots and car drivers) are cooperating to manage the traffic on the surface of airports. They are generally supported by automation tools, like the TARMAC and TAGS systems under develop-

ment at DLR. The functional architecture of the work system Airport Tower is discussed, and the DLR philosophy of automation is illustrated using this functional architecture. The COMPAS system, which is in operational use at the Frankfurt Airport since 1989, is used as a successful example of this philosophy. The role of sensing and sensors in classical control loops as well as in the surface traffic management process is analysed. The importance of explicit representations of the goal and the situation for highly automated surface traffic management is discussed, and the representation problem is highlighted.

Author

Airports; Automatic Control; Traffic Control; Management Systems; Systems Simulation; Airfield Surface Movements

19980002379 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Inst. of Flight Guidance, Brunswick, Germany

Elements and Functions of the Future Airport Ground Movement Management System

Dippe, Dietmar, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; From Sensors to Situation Assessment; 1996, pp. 23-35; In English; Also announced as 19980002377; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

An Airport Ground Movement Management System is a system with high complexity that can be influenced by different other systems and by involved controllers, pilots and vehicle drivers. This article gives an overview of the different functions of an Airport Ground Movement Management System and of the functional elements that are necessary to perform these functions. With the description of the actual system and especially its shortcomings the need for improvements is demonstrated. This analysis has then been the basis for the definition of requirements for the future system. With these requirements it is finally possible to describe the new functional elements that are necessary to perform the functions within the future system.

Author

Airports; Traffic Control; Automatic Control; Management Systems; Ground Support Systems; Airfield Surface Movements

19980002381 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Inst. of Flight Guidance, Brunswick, Germany

Automatic Recognition of Aircraft Registration Marks

Doehler, H. U., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Groll, E., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Hecker, P., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; From Sensors to Situation Assessment; 1996, pp. 53-64; In English; Also announced as 19980002377; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

A sensor based system for automatic identification and recording of aircraft nationality and registration marks (ARM) is presented. This system is intended to support a proposed airport management system, namely Taxiway and Ramp Management and Control-Surveillance and Communication (TARMAC-SC), in the future. The proposed method is based upon an optical character recognition (OCR) statistical classifier, which references a knowledge base of existing ARM. The classifier is easily trained through the presentation of single characters to the system. Prototype features, insensitive to variations in font, size, and slant, are used for individual character recognition. After processing is completed, the results of the ARM identification are passed to the data fusion process of the master control system, TARNIAC-SC.

Author

Airports; Character Recognition; Ground Support Equipment; Traffic Control; Management Systems; Airfield Surface Movements; Image Processing

19980002382 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Inst. For Radio Frequency Technology, Wessling, Germany

A New Solution for Improved Ground Traffic Management: The Near-Range Radar Network

Schroth, A., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Bethke, K. H., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Roede, B., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Sauer, Th., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Schneider, M., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; From Sensors to Situation Assessment; 1996, pp. 65-97; In English; Also announced as 19980002377; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

After some introductory notes with respect to the need for novel, advanced sensors for surface movement guidance and control the DLR Near-Range Radar System (NRN) will be explained and a general system description will be given. The functional characteristics and the structure of a single radar station will be discussed in detail. Due to sophisticated processing of echo signals of expanded pulses, targets with a backscattering cross section of 1 sq m can be detected at a distance of 1 km utilizing fixed, nonrotating antennas having a broad sector characteristics in the azimuth and low power transmitters (less than 10 W). From the complex valued range echo profiles, measured by the four stations of a NRN module, the so called rolling status for a plurality of targets

including classification can be derived. The present status of the development will be presented and the remaining work will be sketched. The field test of the basis station is expected for the fall of 1995.

Author

Airfield Surface Movements; Traffic Control; Automatic Control; Radar Networks; Management Systems; Ground Support Equipment; Radar Tracking

19980002383 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Inst. of Flight Guidance, Brunswick, Germany

Data Fusion for a Surface Movement Guidance and Control System

Hurrass, K. H., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Meier, Ch., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; From Sensors to Situation Assessment; 1996, pp. 99-110; In English; Also announced as 19980002377; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

The operational requirements concerning the surveillance part of a Surface Movement Guidance and Control System (SMGCS) can be fulfilled only by a multi-sensor system. The philosophy is to use each type of sensor only for its adequate task. An important part of this system is the data fusion process combining and interpreting the information of the sensors. Its objective is to provide a consistent traffic situation to the controllers, pilots and SMGCS subsystems for planning and guidance. The DLR concept on SMGCS data fusion and its actual development status is presented.

Author

Airfield Surface Movements; Airports; Multisensor Applications; Multisensor Fusion; Traffic Control; Ground Support Equipment

19980002385 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Inst. of Flight Guidance, Brunswick, Germany

Situation Assessment Within the Context of Dynamic Planning

Boehme, Dietmar, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; From Sensors to Situation Assessment; 1996, pp. 125-133; In English; Also announced as 19980002377; No Copyright; Avail: CASI; A02, Hardcopy; A03, Microfiche

Presupposing that computer decision support will become more and more necessary in order to realize an "intelligent", plan-based control of complex technical systems, the role of situation assessment in context or Dynamic Planning is investigated. With the background of future automatization of Air Traffic Control (ATC) a general control structure is explained containing situation assessment as a functional element which detects and evaluates conflicts. The use of the thus obtained information for both to change the control structure and to determine a suitable planning mode is described. An approach to real-time situation assessment, based on a task decomposition, is given also.

Author

Air Traffic Control; Complex Systems; Real Time Operation; Computer Techniques; Expert Systems; Decision Support Systems; Human-Computer Interface

19980002386 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Inst. of Flight Guidance, Brunswick, Germany

Conflict Recognition in Air Traffic Control

Gerling, Wilfried, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; From Sensors to Situation Assessment; 1996, pp. 135-147; In English; Also announced as 19980002377; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

The prediction of horizontal conflicts between aircraft on the basis of surveillance data may be enhanced if planned changes of aircraft's ground course are taken into consideration. Assuming standard turn maneuvers, the predicted flight paths and the horizontal distances are calculated as a function of time. The estimated constant wind component will strongly influence the appearance of the predicted flight profiles and the prediction of separation distances. The high resolution of the mathematical distance function is condensed by extracting particular conflict attributes which have been defined in terms of severity, urgency, dynamics, and duration. These data which describe the individual situation of a specific aircraft encounter, will build the primary basis for conflict evaluation. The evaluation process will be additionally influenced by secondary parameters which represent the situation of the considered aircraft in view of the surrounding air traffic, the ATC concept and technical systems, and the human controller. The result of this assessment methodology will be a "measure of threat" which may be used by the responsible controller as an advisory aid.

Author

Air Traffic Control; Surveillance; Air Traffic; Air Navigation; Flight Paths; Position (Location); Computer Techniques; Automatic Control

19980002387 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Inst. of Flight Guidance, Brunswick, Germany

Development of a Taxi Assistance and Guidance System

Haertl, Dipl.- Ing., Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; From Sensors to Situation Assessment; 1996, pp. 151-164; In English; Also announced as 19980002377; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

The DLR Institute of Flight Guidance is developing the Taxi and Ramp Management and Control system (TARMAC) for future aircraft guidance and control on the ground. The subsystem TARMAC-AS (-Airborne System) supports the pilot during his taxiing maneuvers by offering weather-independent position determination and navigation, monitoring of pilots action, and presentation of the aircraft-related information generated by a planning system on the ground. For the evaluation, a particular cockpit simulator with visual system and with the capability to control up to 50 other aircraft was built. Tests with airline pilots under different traffic and weather conditions provided a wide range of results and confirmed the chosen system layout.

Author

Aircraft Guidance; Taxiing; Airfield Surface Movements; Surface Navigation; Computer Techniques; Human-Computer Interface; Ground Support Equipment; Management Systems

19980002388 Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Inst. of Flight Guidance, Brunswick, Germany

Situation Representation for Controllers

Beyer, Ralf, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; Schenk, Hans-Dieter, Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Germany; From Sensors to Situation Assessment; 1996, pp. 165-185; In English; Also announced as 19980002377; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

Realistic air traffic situation representations are needed because most of the air traffic situation cannot be perceived directly and must be acquired by remote sensing. Appropriate situation representations are also needed by the support tools which become most efficient if they refer to the same situation and in a similar way as the air traffic controller. Air traffic situations can be represented by models and pictures on the basis of objective data which in case of the air traffic controller get transformed by factors like experience and workload and by the type of interaction with the air traffic control system. This has led to certain assumptions on the use of mental models in air traffic control which - if not yet suitable for immediate implementation - at least have helped to structure the process of situation representation and to design the required human/machine interfaces more systematically.

Author

Air Traffic Control; Human-Computer Interface; Ground Support Systems; Computer Techniques; Automatic Control; Expert Systems; Air Traffic Controllers (Personnel); Systems Simulation

19980002389 Technische Hochschule, Lehrstuhl fuer Technische Informatik, Aachen, Germany

Virtual Reality: Technology and Applications

Kraiss, K. F., Technische Hochschule, Germany; Kuhlen, T., Technische Hochschule, Germany; From Sensors to Situation Assessment; 1996, pp. 187-208; In English; Also announced as 19980002377; No Copyright; Avail: CASI; A03, Hardcopy; A03, Microfiche

This paper provides a survey about Virtual Reality and its possible applications. After a short definition of Virtual Reality the available hardware is described as well as commercial software tools supporting the development of applications. The degree of realism achievable by today's graphics hardware is discussed. The spectrum of possible applications for Virtual Reality is demonstrated by examples from robotics, medicine and scientific visualization. Special attention is given to applications in aviation, i.e., flight simulation and air traffic control (ATC). In particular, an innovative concept for a three dimensional air traffic controllers workplace is presented which makes use of a technique named "Virtual Holography".

Author

Air Traffic Control; Virtual Reality; Computer Techniques; Human-Computer Interface

05

AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology. For related information see also 18 Spacecraft Design, Testing and Performance and 39 Structural Mechanics. For land transportation vehicles see 85 Urban Technology and Transportation.

19980002449 Technische Univ., Faculty of Aerospace Engineering, Delft, Netherlands

Six Degrees of Freedom Linear Model for Helicopter Trim and Stability Calculation

Pavel, M., Technische Univ., Netherlands; Dec. 1996; 83p; In English; Figures in this document may not be legible in mic Report No.(s): PB97-183032; Memo-M-756; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

This report develops a six degrees of freedom linear model for helicopter flight dynamics applications. The main assumption made is that the changes in rotor attitude relative to the body are small compared to the changes in the body attitude which is available in the low-frequency domain. The body linear model results writing to non-linear equations of motion with respect to three directions and three rotations are then linearising these equations around a suitable trim condition. The model is quasi-static in nature and considers the rotor aerodynamics forces and moments through their contributions to the 6x6 matrix of derivatives. Therefore, the dynamic effect of the rotor modes is not considered. The model can be applied to any existing helicopter.

NTIS

Aerodynamic Balance; Aerodynamic Stability; Attitude (Inclination); Equations of Motion; Helicopter Control; Rotor Aerodynamics

19980002450 Technische Univ., Faculty of Aerospace Engineering, Delft, Netherlands

Prediction of the Necessary Flapping Dynamics for Helicopter Flight Simulation

Pavel, M., Technische Univ., Netherlands; Dec. 1996; 48p; In English; Figures in this document may not be legible in mic Report No.(s): PB97-183040; Memo-M-757; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The report explains the influence of rotor flapping degree of freedom on the helicopter motion, describing a method which can be used to predict if the flapping dynamics of the rotor must be included in a helicopter flight dynamics model.

NTIS

Degrees of Freedom; Flight Simulation; Aerodynamics

19980002577 Technische Univ., Faculty of Aerospace Engineering, Delft, Netherlands

Derivation and Results of an ADAS Program for the Dutch Green Aircraft Pilot-Study

Fransen, S. H. J. A., Technische Univ., Netherlands; Torenbeek, E., Technische Univ., Netherlands; Oct. 1996; 39p; In English Report No.(s): PB97-190128; Memo-M-735; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Department of Aerospace Engineering of DUT participated in a Pilot-Study, aimed at generating specific knowledge required to develop future cleaner, more silent and fuel efficient transport aircraft. This Memorandum reports about the detailed derivation and results of an ADAS (Aircraft Design and Analysis System) program which enables the user to incorporate (certification) noise requirements into the conceptual design. It also contains results of a mission fuel analysis for two aircraft projects of the Fokker 100 class, with different powerplant systems.

NTIS

Aircraft Pilots; Aircraft Design; Transport Aircraft

19980002740 General Accounting Office, National Security and International Affairs Div., Washington, DC USA

Unmanned Aerial Vehicles: Outrider Demonstrations Will Be Inadequate to Justify Further Production

Davis, Tana, General Accounting Office, USA; Warren, John, General Accounting Office, USA; Rodrigues, Louis J., General Accounting Office, USA; Ward, Charles, General Accounting Office, USA; Sep. 1997; 22p; In English Report No.(s): GAO/NSIAD-97-153; B-276890; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

DOD is not applying lessons learned from prior unmanned aerial vehicle programs to the Outrider ACTD. For example, despite problems with the Pioneer and Hunter stemming from DOD's decision to award further production contracts without conducting operational testing or demonstrating that the system is user-supportable, DOD is pursuing the same strategy for the Outrider. In addition, DOD has underestimated, as it did for the Pioneer and the Hunter programs, the time and effort necessary to integrate non-developmental items into Outrider. Moreover, the Outrider system may not satisfy user needs unless problems associated with meeting joint requirements are resolved and interoperability with other DOD systems is ensured. Consequently, DOD will not have assurance that Outrider will meet user needs by the time of the planned fiscal year 1998 low-rate production decision.

Author

Pilotless Aircraft; Military Technology; Military Operations

19980003289 Federal Aviation Administration, Regulatory Support Div., Oklahoma City, OK USA

Approved Parts Course Guide and Reference Material

1997; 85p; In English

Report No.(s): PB97-194161; AFS-600; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

No abstract available.

NTIS

Aircraft Equipment; Aircraft Reliability

19980003318 Technische Univ., Faculty of Aerospace Engineering, Delft, Netherlands

Experience with Optimal Input Design for Helicopter Parameter Identification

Sridhar, J. K., Technische Univ., Netherlands; Place, C. S., Technische Univ., Netherlands; Breeman, J. H., Technische Univ., Netherlands; Dec. 1996; 22p; In English

Report No.(s): PB97-190151; MEMO-732; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This paper investigates a technique for the optimal design of helicopter control inputs, in order to provide the most accurate parameter estimates. An existing software package for optimal input design for fixed wing aircraft was modified to design control inputs for rotary wing aircraft. The design issues are discussed with some inherent problems of helicopter dynamics in mind. The design technique encompasses the salient features of Mehra's design technique in the frequency domain (using Convex Analysis) with Mulder's technique for decoupling state and parameter estimation. The input design is performed for power constrained inputs by optimizing a norm of Fisher's information matrix. The results are presented for the BO-105 helicopter, using data supplied by DLR, Germany.

NTIS

Helicopter Control; Optimal Control; Parameter Identification; BO-105 Helicopter; Rotary Wing Aircraft; Applications Programs (Computers); Aircraft Configurations

19980003445 NASA Langley Research Center, Hampton, VA USA

Guide to AERO2S and WINGDES Computer Codes for Prediction and Minimization of Drag Due to Lift

Carlson, Harry W., Lockheed Martin Engineering and Sciences Co., USA; Chu, Julio, NASA Langley Research Center, USA; Ozoroski, Lori P., NASA Langley Research Center, USA; McCullers, L. Arnold, Vigyan Research Associates, Inc., USA; Nov. 1997; 146p; In English

Contract(s)/Grant(s): RTOP 537-09-20-02

Report No.(s): NASA/TP-3637; NAS 1.60:3637; L-17546; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

The computer codes, AERO2S and WINGDES, are now widely used for the analysis and design of airplane lifting surfaces under conditions that tend to induce flow separation. These codes have undergone continued development to provide additional capabilities since the introduction of the original versions over a decade ago. This code development has been reported in a variety of publications (NASA technical papers, NASA contractor reports, and society journals). Some modifications have not been publicized at all. Users of these codes have suggested the desirability of combining in a single document the descriptions of the code development, an outline of the features of each code, and suggestions for effective code usage. This report is intended to supply that need.

Author

Computer Programs; User Manuals (Computer Programs); Predictions; Aerodynamic Drag

07

AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft. For related information see also 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels, and 44 Energy Production and Conversion.

19980003860 NERAC, Inc., Tolland, CT USA

Ramjets: Solid Propellant, Integral Rocket/Ramjet, and Dual Combustion Mode (Latest citations from the NTIS Bibliographic Database)

Oct. 1996; In English; Page count unavailable

Report No.(s): PB97-850853; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning advanced concepts in ramjet and turboramjet engines. These concepts pertain to the use of solid fuels, integral rocket/ramjet configurations, and dual combustion modes for ramjets used in turboramjet aircraft. The citations cover vehicle design, fuels, air inlets, exhaust nozzles, test facilities, and test results. Applications include supersonic and hypersonic missiles, aircraft, and artillery projectiles.

NTIS

Bibliographies; Ramjet Engines; Turboramjet Engines; Solid Rocket Propellants; Combustion

RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands. For related information see also 14 Ground Support Systems and Facilities (Space).

19980003446 NERAC, Inc., Tolland, CT USA

Airport Runways. (Latest citations from the Ei Compendex*Plus database)

Dec. 1996; In English; Page count unavailable. Supersedes PB96-853007.

Report No.(s): PB97-852909; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning design, construction, maintenance, and repair of airport runways. Studies include dynamic response of runways to aircraft loads, non-destructive tests of runway strength, and evaluation of runway properties as to roughness, slipperiness, crack propagation, and maneuverability space for various types of landing gear. Runway paving materials include concrete, synthetic polymers, asphalt, bonded layer materials, and various aggregate materials. The paving materials are developed both for initial construction and for rapid repair. Many citations refer to construction of runways in cold environments and perma-frost regions, and to evaluation of landing mats.(Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Runways

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see 91 Lunar and Planetary Exploration.

19980003798 NERAC, Inc., Tolland, CT USA

Interplanetary Travel. (Latest citations from the Aerospace Database)

Aug. 1996; In English; Page count unavailable.

Report No.(s): PB96-872155; NASA/TM-96-113028; NAS 1.15:113028; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning travel between the planets. Topics include payloads, industrialization and colonization of space, and propulsion systems for vehicles to be used in interplanetary travel. Human life support systems for interplanetary travel are also discussed.

NTIS

Bibliographies; Payloads; Propulsion System Configurations; Propulsion System Performance; Space Commercialization; Space Industrialization; Life Support Systems

19980003799 NERAC, Inc., Tolland, CT USA

Interstellar Travel. (Latest citations from the Aerospace Database)

Aug. 1996; In English; Page count unavailable.

Report No.(s): PB96-872221; NASA/TM-96-113450; NAS 1.15:113450; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning travel between the stars. Topics include cost considerations, hyperspace navigation, exploration, and propulsion systems for vehicles to be used in interstellar travel. Human factor issues and social aspects of interstellar travel are also discussed.

NTIS

Bibliographies; Space Transportation; Spacecraft; Hyperspaces; Propulsion System Performance; Interstellar Travel

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment; e.g., mobile transporters; and simulators. For related information see also 09 Research and Support Facilities (Air).

19980003427 West Virginia Univ., Morgantown, WV USA

Developing Nationally Competitive NASA Research Capability in West Virginia Final Report

Calzonetti, Frank J., West Virginia Univ., USA; Dec. 08, 1997; 8p; In English

Contract(s)/Grant(s): NAGw-4464

Report No.(s): NASA/CR-97-206439; NAS 1.26:206439; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

In May, 1995 West Virginia EPSCOR was awarded \$150,000 to support activities to develop research capabilities in West Virginia in support of the National Aeronautics and Space Administration (NASA). These funds were used to support three projects: 1) Information Processing and the Earth Observing System, directed by Dr. Stuart Tewksbury of West Virginia University; 2) Development of Optical Materials for Atmospheric Sensing Experiments, directed by Dr. Nancy Giles of West Virginia University; and 3) Development of Doppler Global Velocimeter (DGV) for Aeronautical and Combustion Studies, directed by Dr. John Kuhlman of West Virginia University. The funding provides the means to develop capability in each of these areas. This report summarizes the technical accomplishments in each project supported under this award.

Author

Research Management; Data Processing; Earth Observing System (EOS); Optical Materials; Product Development

LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; operating problems of launch/space vehicle systems; and reusable vehicles. For related information see also 20 Spacecraft Propulsion and Power.

19980002924 Sandia National Labs., Albuquerque, NM USA

Stars MDT-2 Targets Mission,

Sims, Brent A., Sandia National Labs., USA; White, John E., Sandia National Labs., USA; Jan. 1997; 15p; In English

Contract(s)/Grant(s): DE-AC04-94AL85000

Report No.(s): AD-A329052; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Strategic Target System (STARS) was launched successfully on August 31, 1996 from the Kauai Test Facility (KTF) at the Pacific Missile Range Facility (PMRF). The STARS 2 booster delivered a payload complement of 26 vehicles atop a post boost vehicle. These targets were designed and the mission planning was achieved to provide a dedicated mission for view by the Midcourse Space Experiment (MSX) Satellite Sensor Suite. Along with the MSX satellite, other corollary sensors were involved. Included in these were the Airborne Surveillance Test Bed (AST) aircraft, the Cobra Judy sea based radar platform, Kwajalein Missile Range (KMR), and the Kiernan Reentry Measurements Site (KREMS). The launch was a huge success from all aspects. The STARS booster flew a perfect mission from hardware, software and mission planning respects. The payload complement achieved its desired goals. All sensors (space, air, ship, and ground) attained excellent coverage and data recording.

DTIC

Spaceborne Experiments; Aerial Reconnaissance; Mission Planning; Payloads; Test Facilities

19980003332 NASA Johnson Space Center, Houston, TX USA

Measurement of Momentum Transfer Coefficients for H₂, N₂, CO, and CO₂ Incident Upon Spacecraft Surfaces

Cook, Steven R., Los Alamos National Lab., USA; Hoffbauer, Mark A., Los Alamos National Lab., USA; Nov. 1997; 82p; In English

Report No.(s): NASA-TP-3701; NAS 1.60:3701; S-834; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Measurements of momentum transfer coefficients were made for gas-surface interactions between the Space Shuttle reaction control jet plume gases and the solar panel array materials to be used on the International Space Station. Actual conditions were simulated using a supersonic nozzle source to produce beams of the gases with approximately the same average velocities as the gases have in the Shuttle plumes. Samples of the actual solar panel materials were mounted on a torsion balance that was used to measure the force exerted on the surfaces by the molecular beams. Measurements were made with H₂, N₂, CO, and CO₂ incident upon the solar array material, Kapton, SiO₂-coated Kapton, and Z93-coated Al. The measurements showed that molecules scatter from the surfaces more specularly as the angle of incidence increases and that the scattering behavior has a strong dependence upon both the incident gas and velocity. These results show that for some technical surfaces the simple assumption of diffuse scattering with complete thermal accommodation is entirely inadequate. It is clear that additional measurements are required to produce models that more accurately describe the gas-surface interactions encountered in rarefied flow regimes.

Author

Solar Arrays; Plumes; Momentum Transfer; International Space Station; Gas-Solid Interactions; Hydrogen; Silicon Dioxide; Surface Reactions; Rarefied Gas Dynamics; Nitrogen

19980003826 New Technology, Inc., Huntsville, AL USA

Bantam System Technology Project Ground System Operations Concept and Plan Interim Report, 18 Oct. - 18 Nov. 1997

Moon, Jesse M., New Technology, Inc., USA; Beveridge, James R., New Technology, Inc., USA; Oct. 17, 1997; 31p; In English
Contract(s)/Grant(s): NAS8-97319

Report No.(s): NASA/CR-97-206474; NAS 1.26:206474; TR-1019; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The Low Cost Booster Technology Program, also known as the Bantam Booster program, is a NASA sponsored initiative to establish a viable commercial technology to support the market for placing small payloads in low earth orbit. This market is currently served by large boosters which orbit a number of small payloads on a single launch vehicle, or by these payloads taking up available space on major commercial launches. Even by sharing launch costs, the minimum cost to launch one of these small satellites is in the 6 to 8 million dollar range. Additionally, there is a shortage of available launch opportunities which can be shared in this manner. The goal of the Bantam program is to develop two competing launch vehicles, with launch costs in the neighborhood of 1.5 million dollars to launch a 150 kg payload into low earth orbit (200 nautical mile sun synchronous). Not only could the cost of the launch be significantly less than the current situation, but the payload sponsor could expect better service for his

expenditure, the ability to specify his own orbit, and a dedicated vehicle. By developing two distinct launch vehicles, market forces are expected to aid in keeping customer costs low.

Author

Launch Vehicles; Ground Operational Support System

16

SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques. for related information see also 03 Air Transportation and Safety and 18 Spacecraft Design, Testing and Performance. For space suits see 54 Man/System Technology and Life Support

19980003836 Alabama Univ., Research Administration, Huntsville, AL USA

Affordable In-Space Transportation Phase 2: An Advanced Concepts Project Final Report

1996; 72p; In English; Technical Interchange Meeting, 16-17 Oct. 1996, USA

Contract(s)/Grant(s): NAS8-38609

Report No.(s): NASA/CR-97-206469; NAS 1.26:206469; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

The Affordable In-Space Transportation (AIST) program was established by the NASA Office of Space Access to improve transportation and lower the costs from Low Earth Orbit (LEO) to Geostationary Earth Orbit (GEO) and beyond (to Lunar orbit, Mars orbit, inner solar system missions, and return to LEO). A goal was established to identify and develop radically innovative concepts for new upper stages for Reusable Launch Vehicles (RLV) and Highly Reusable Space Transportation (HRST) systems. New architectures and technologies are being identified which have the potential to meet a cost goal of \$1,000 to \$2,000 per pound for transportation to GEO and beyond for overall mission cost (including the cost to LEO). A Technical Interchange Meeting (TTM) was held on October 16 and 17, 1996 in Huntsville, Alabama to review previous studies, present advanced concepts and review technologies that could be used to meet the stated goals. The TIN4 was managed by NASA-Marshall Space Flight Center (MSFC) Advanced Concepts Office with Mr. Alan Adams providing TIM coordination. Mr. John C. Mankins of NASA Headquarters provided overall sponsorship. The University of Alabama in Huntsville (UAH) Propulsion Research Center hosted the TIM at the UAH Research Center. Dr. Clark Hawk, Center Director, was the principal investigator. Technical support was provided by Christensen Associates. Approximately 70 attendees were present at the meeting. This Executive Summary provides a record of the key discussions and results of the TIN4 in a summary for-mat. It incorporates the response to the following basic issues of the TDVL which addressed the following questions: 1. What are the cost drivers and how can they be reduced? 2. What are the operational issues and their impact on cost? 3. What is the current technology readiness level (TRL) and what will it take to reach TRL 6? 4. What are the key enabling technologies and sequence for their accomplishment? 5. What is the proposed implementation time frame? See Appendix A for the TIM Agenda and Appendix C for the AIST Program Terms of Reference.

Derived from text

Space Transportation System; Low Earth Orbits; Cost Reduction; Geosynchronous Orbits; Reusable Launch Vehicles; Technology Assessment; Lunar Orbits; Costs

19980003851 NERAC, Inc., Tolland, CT USA

Space Shuttle Endeavour: Latest citations from the Ei Compendex*Plus Database

Jul. 1996; In English; Page Count Unavailable

Report No.(s): PB96-871124; Copyright Waived; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning missions of the space shuttle Endeavour. Topics include mission observations, payload contents, and analyses of scientific data collected from experimental payloads. Future mission objectives are discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Endeavour (Orbiter); Bibliographies; Space Missions

19980003862 NERAC, Inc., Tolland, CT USA

X-33: The Next Generation Space Shuttle. (Latest citations from the Aerospace Database)

Jul. 1996; In English; Page count unavailable.

Report No.(s): PB96-871850; NASA/TM-96-113029; NAS 1.15:113029; Copyright Waived; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the X-33 Reusable Launch Vehicle (RLV) as a replacement for the space shuttle. The X-34 and DC-X single stage to orbit (SSTO) programs, which preceded the X-33 program, and research activities on winged space vehicles and air turbo ramjet propulsion systems are examined. Development of the aerospike propulsion system used in the X-33 is also discussed.

NTIS

X-33 Reusable Launch Vehicle; Single Stage to Orbit Vehicles; Bibliographies; Propulsion System Configurations; Ramjet Engines; Space Shuttles

18

SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls. For life support systems see 54 Man/System Technology and Life Support. For related information see also 05 Aircraft Design, Testing and Performance, 39 Structural Mechanics, and 16 Space Transportation.

19980002505 General Accounting Office, National Security and International Affairs Div., Washington, DC USA

Space Station: Cost Control Problems are Worsening. Report to Congressional Requesters

Sep. 1997; 26p; In English

Report No.(s): GAO/NSIAD-97-213; B-276834; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Some of NASA'S actions to reinforce its financial reserves and keep the program within its funding limitations have involved redefining the portion of the program subject to the limitations. Such actions make the value of the current limitations as a funding control mechanism questionable. Therefore, we recommend that the NASA Administrator, with the concurrence of the Office of Management and Budget, direct the space station program to discontinue the use of the current funding limitations.

Author

Congressional Reports; Financial Management; Cost Estimates

19980003331 California Inst. of Tech., Div. of Physics, Mathematics, and Astronomy, Pasadena, CA USA

Submillimeter Spectroscopy with a 500-1000 GHz SIS Receiver Final Report

Zmuidzinas, J., California Inst. of Tech., USA; 1997; 20p; In English

Contract(s)/Grant(s): NAG2-744

Report No.(s): NASA/CR-97-113002; NAS 1.26:113002; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Sub-millimeter Spectroscopy with a 500-1000 GHz SIS Receiver, which extended over the period October 1, 1991 through January 31, 1997. The purpose of the grant was to fund the development and construction of a sensitive heterodyne receiver system for the submillimeter band (500-1000 GHz), using our newly-developed sensitive superconducting (SIS) detectors, and to carry out astronomical observations with this system aboard the NASA Kuiper Air- borne Observatory (a Lockheed C-141 aircraft carrying a 91 cm telescope). A secondary purpose of the grant was to stimulate the continued development of sensitive submillimeter detectors, in order to prepare for the next-generation airborne observatory, SOFIA, as well as future space missions (such as the ESA/NASA FIRST mission).

Derived from text

Kuiper Airborne Observatory; Submillimeter Waves; Astronomy; C-141 Aircraft

19980003847 Boeing Defense and Space Group, Seattle, WA USA

Comparison of Spacecraft Contamination Models with Well-Defined Flight Experiment Interim Report, 15 May - 15 Aug. 1997

Pippin, Gary, Boeing Defense and Space Group, USA; 1997; 25p; In English

Contract(s)/Grant(s): NAS8-40581

Report No.(s): NASA-CR-205211; NAS 1.26:205211; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Electron Spectroscopy for Chemical Analysis (ESCA) survey measurements completed on the tray wall sections cut from LDEF tray locations C6-2, A4-9, and E10-8 are reported.

Derived from text

Electron Spectroscopy; Spacecraft Contamination

SPACECRAFT INSTRUMENTATION

For related information see also 06 Aircraft Instrumentation and 35 Instrumentation and Photography.

19980002679 San Jose State Univ., CA USA

Micro-Pressure Sensors for Future Mars Missions *Final Report, 21 Jun. 1995 - 21 Mar. 1996*

Catling, David C., San Jose State Univ., USA; 1996; 4p; In English

Contract(s)/Grant(s): NCC2-5130

Report No.(s): NASA/CR-97-205838; NAS 1.26:205838; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The joint research interchange effort was directed at the following principal areas: u further development of NASA-Ames' Mars Micro-meteorology mission concept as a viable NASA space mission especially with regard to the science and instrument specifications u interaction with the flight team from NASA's New Millennium 'Deep-Space 2' (DS-2) mission with regard to selection and design of micro-pressure sensors for Mars u further development of micro-pressure sensors suitable for Mars The research work undertaken in the course of the Joint Research Interchange should be placed in the context of an ongoing planetary exploration objective to characterize the climate system on Mars. In particular, a network of small probes globally-distributed on the surface of the planet has often been cited as the only way to address this particular science goal. A team from NASA Ames has proposed such a mission called the Micrometeorology mission, or 'Micro-met' for short. Surface pressure data are all that are required, in principle, to calculate the Martian atmospheric circulation, provided that simultaneous orbital measurements of the atmosphere are also obtained. Consequently, in the proposed Micro-met mission a large number of landers would measure barometric pressure at various locations around Mars, each equipped with a micro-pressure sensor. Much of the time on the JRI was therefore spent working with the engineers and scientists concerned with Micro-met to develop this particular mission concept into a more realistic proposition.

Author

Mars Exploration; Atmospheric Pressure; Mars Atmosphere; Climate; Micrometeorology; Mission Planning; Pressure Sensors; Space Exploration

SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. For related information see also 07 Aircraft Propulsion and Power, 28 Propellants and Fuels, 44 Energy Production and Conversion, and 15 Launch Vehicles and Space Vehicles.

19980002752 Lawrence Livermore National Lab., Livermore, CA USA

Integrated Modular Propulsion and Regenerative Electro-energy Storage System (IMPRESS) for small satellites

Mitlitsky, F., Lawrence Livermore National Lab., USA; deGroot, W., NYMA, Inc., USA; Butler, L., United Technologies Corp., USA; McElroy, J., United Technologies Corp., USA; Sep. 1996; 20p; In English; 10th; Small Satellite, 16-19 Sep. 1996, Logan, UT, USA; Sponsored by American Inst. of Aeronautics and Astronautics, USA

Contract(s)/Grant(s): W-7405-eng-48

Report No.(s): UCRL-JC-125242; CONF-9609207-3; DE97-051654; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The IMPRESS is a significant advancement in space system technology as it is able to operate alternately as a fuel cell to produce electrical power from stored hydrogen and oxygen and as a water electrolyzer using electrical power to produce hydrogen and oxygen from stored water. The electrolysis of a controllable fraction of stored water can provide high Isp rocket propellants on demand. The heart of the IMPRESS is the Unitized Regenerative Fuel Cell (URFC), which produces power and electrolytically regenerates its reactants using a single stack of reversible cells. This integrated approach has several significant advantages over separate (battery) power and propulsion systems.

DOE

Energy Storage; Electric Batteries; Electrolysis; Fuel Cells; Regenerative Fuel Cells; Rocket Propellants

23
CHEMISTRY AND MATERIALS (GENERAL)

19980002687 NASA Lewis Research Center, Cleveland, OH USA

Electron Affinity Calculations for Thioethers

Sulton, Deley L., Cleveland State Univ., USA; Boothe, Michael, Cleveland State Univ., USA; Ball, David W., Cleveland State Univ., USA; Morales, Wilfredo, NASA Lewis Research Center, USA; Nov. 1997; 12p; In English; 1998 Annual Meeting, 17-21 May 1998, Detroit, MI, USA; Sponsored by Society of Tribologists and Lubrication Engineers, USA

Contract(s)/Grant(s): RTOP 523-22-13

Report No.(s): NASA-TM-113178; NAS 1.15:113178; E-10942; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Previous work indicated that polyphenyl thioethers possessed chemical properties, related to their electron affinities, which could allow them to function as vapor phase lubricants (VPL). Indeed, preliminary tribological tests revealed that the thioethers could function as vapor phase lubricants but not over a wide temperature and hertzian pressure range. Increasing the electron affinity of the thioethers may improve their VPL properties over this range. Adding a substituent group to the thioether will alter its electron affinity in many cases. Molecular orbital calculations were undertaken to determine the effect of five different substituent groups on the electron affinity of polyphenyl thioethers. It was found that the NO₂, F, and I groups increased the thioethers electron affinity by the greatest amount. Future work will involve the addition of these groups to the thioethers followed by tribological testing to assess their VPL properties.

Author

Molecular Orbitals; Electron Affinity; Lubricants; Lubrication

19980003780 NERAC, Inc., Tolland, CT USA

Effects of Cryogenic Temperatures on Materials Properties (Latest citations from the Aerospace Database)

Nov. 1996; In English; Page count unavailable

Report No.(s): NASA/TM-96-113451; NAS 1.15:113451; PB97-851414; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)); US Sales Only, Microfiche

The bibliography contains citations concerning properties of materials at cryogenic temperatures. Cryogenic effects on mechanical, magnetic, electrical, and other physical properties of materials are described. Titanium, aluminum, copper, nickel, steels, ice, carbides, cermets, ceramics, composites, alloys, and polymers are among the materials discussed. Strength of materials at low temperatures, with particular regard to fatigue and shear cracking, is included. Cryogenic cooling systems are discussed in separate bibliographies.

NTIS

Bibliographies; Cryogenics; Metals; Alloys; Steels; Cryogenic Temperature

19980003858 NERAC, Inc., Tolland, CT USA

Smart Materials: Latest citations from the INSPEC Database

Oct. 1996; In English; Page count unavailable, Supersedes PB96-850623.

Report No.(s): PB97-850499; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, development, and fabrication of smart and intelligent materials. Citations examine materials and systems that exhibit high performance characteristics in sensing and actuating functions and respond adaptively to their environments. Topics include piezoelectric materials, self-repair materials, band structure manipulation, future electronics, synthetic and biological macromolecules, and smart multiphase composites. References cover applications in electromechanical devices, opto-electronics, information storage and processing, vibration control, coatings, prosthetics, switches, filters, and antennas.

NTIS

Bibliographies; Electromechanical Devices; Fabrication; Design Analysis; Product Development; Macromolecules; Smart Structures; Piezoelectric Ceramics

COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials. For ceramic materials see 27 Nonmetallic Materials.

19980002522 NERAC, Inc., Tolland, CT USA

Design and Properties of Joints in Composites (Latest citations from Engineered Materials Abstracts)

Dec. 1996; In English; Page count unavailable

Report No.(s): PB97-852255; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design of joints for composite materials and their resulting mechanical properties. References cover bending, buckling, compression, creep, deformation, elasticity, fatigue, fracture, impact, and shear properties. Adhesive, bolted, flanged, lap, riveted, scarf, and welded joints are discussed. Ceramic, metal, and plastic composites are covered.

NTIS

Composite Materials; Mechanical Properties; Impact Strength; Impact Resistance; Elastic Properties; Creep Properties

19980002528 NERAC, Inc., Tolland, CT USA

Composite Tribological Materials (Latest citations from Fluidex)

Dec. 1996; In English; Page count unavailable

Report No.(s): PB97-852271; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the properties, behavior, and uses of composite tribological materials in and on various objects, devices, and equipment. The citations examine friction and wear characteristics, mechanisms, and the performance of these materials and the objects to which they are applied. Composite tribological materials are used, for example, in bearings, gears, and piston rings. Included are self lubricating materials.

NTIS

Tribology; Self Lubricating Materials; Gears; Wear

19980002706 Pennsylvania Dept. of Transportation, Engineering Technology Section, Harrisburg, PA USA

Fiber Column Wrap Strengthening System

Sukley, R., Pennsylvania Dept. of Transportation, USA; Apr. 1997; 106p; In English

Report No.(s): PB97-170609; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

The Tyfo S Tensioned Column Strengthening System incorporates high strength composite fibers and epoxy resin to strengthen concrete columns especially, for seismic retrofit projects. The manufacturer, R.J. Watson, Inc. explains that its product is economical and easy to install. The objective of this research project is to evaluate the performance, durability and cost effectiveness of using the Tyfo S Column Strengthening System. A four-span Composite Steel I-Beam and multi-Girder Bridge in Lackawanna County on SR 0084, was selected as a test site for seismic retrofit. The site was constructed in August of 1993 and has performed satisfactory with no deterioration noticeable after the initial three years. This evaluation will continue to evaluate the performance, durability and cost effectiveness of the Tyfo S System for at least five years or until a seismic event occurs.

NTIS

Reinforcement (Structures); Bridges (Structures); Performance Tests; Composite Materials; Epoxy Resins; Reinforcing Fibers

19980002836 NERAC, Inc., Tolland, CT USA

Failure Analysis of Composite Materials: Latest citations from Engineered Materials Abstracts

Sep. 1996; In English; Page Count Unavailable

Report No.(s): PB96-873419; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning failure and post failure analyses of composite materials. Among the materials tested are fiber reinforced epoxy, laminated composites, carbon epoxy, carbon-carbon composites, non-ceramic insulators, and Kevlar composites. Fractography of fiber reinforced plastics is also examined. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Failure Analysis; Carbon-Carbon Composites; Fiber Composites; Epoxy Matrix Composites

19980002879 Institute for Defense Analyses, Alexandria, VA USA

Workshop on Closed Mold Manufacturing of High Performance Composite Missile Structures Final Report, Mar. - Nov. 1995

Sater, J., Institute for Defense Analyses, USA; Nov. 1995; 489p; In English; Workshop on Closed Mold Manufacturing of High Performance Composite Missile Structures, 15-16 May 1995; Original contains color illustrations

Report No.(s): PB96-199708; IDA-D-1797; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Closed mold manufacturing processes such as resin transfer molding or matched metal net-shape molding offer potential low-cost methods for making components for missiles. A workshop involving missile producers, material suppliers (resins, preforms, prepregs), and parts fabricators was planned, in part, to promote communication among the appropriate groups. The agenda was put together by LtCol Michael Obal and Dr. Janet M. Sater (Institute for Defense Analyses) to address technical issues and limitations associated with closed mold manufacturing of high performance polymer composites for missile applications. The workshop was hosted by IDA on May 15-16, 1995.

NTIS

Composite Structures; Missile Structures; Composite Materials; Conferences

19980002923 Air Force Inst. of Tech., School of Engineering, Wright-Patterson AFB, OH USA

Fiber Volume Fraction Effects on Fatigue Response of a SCS-6/Ti-15-3 Metal Matrix Composite at Elevated Temperature

Coghlan, Sean C., Air Force Inst. of Tech., USA; Sep. 1997; 97p; In English

Report No.(s): AD-A329447; AFIT/GAE/ENY/97S-01; No Copyright; Avail: CASI; A05, Hardcopy; A02, Microfiche

The purpose of this study was to determine the effects of fiber volume fraction on the fatigue behavior of Silicon Carbide fiber-reinforced Titanium alloy, SCS-6/Ti-15-3. Three fiber volume fractions were investigated; 15%, 25%, and 42%. The tests were performed under fully-reversed, strain-controlled conditions at 427 C. The primary objectives of this study were to develop a fatigue life diagram and to document the damage and failure mechanisms. Compressive loads on the slender specimens were kept from buckling the specimens through the use of a buckling guide. This device allows unrestricted axial movement of the composite, while preventing any out-of-plane motion. No buckling damage due to compression was found in any of the specimens. Modulus behavior and stress versus strain curves were recorded during cycling for each test. An applied strain range between 0.5% and 1.1% was used for the majority of the tests. This resulted in fatigue lives between approximately 10,000 and 100,000 cycles. The resulting fatigue life diagram showed similar life at strain ranges at and above 0.008 mm/mm for all fiber volume fractions. At strain levels below 0.008 mm/mm, there was an increasing fatigue life with increasing fiber volume fraction. The 15% and 42% V sub f material was consolidated with a molybdenum cross-weave to hold the fibers in alignment. The 25% V sub f material had a titanium-niobium cross-weave for the same purpose. The Mo cross-weave was present on every fracture surface of the 15% and 42% V sub f material. This indicated that it was detrimental to the fatigue life of the composite. No cross-weave material was found on the fracture surfaces of the 25% V sub f. Major cause of specimen failure was the initiation and propagation of fatigue cracks in the matrix that were perpendicular to the applied load.

DTIC

Metal Matrix Composites; Silicon Carbides; Titanium Alloys; Fiber Composites; Crack Propagation; Fracturing; Buckling

19980002938 NERAC, Inc., Tolland, CT USA

Extrusion and Pultrusion of Composites: Latest citations from Engineered Materials Abstracts

Aug. 1996; In English; Page Count Unavailable

Report No.(s): PB96-873252; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the processes and properties of extrusion and pultrusion of composites. Among the materials discussed are blocked polyurethane, nylon-6, thermoplastic matrices, epoxies, alumina-silicon carbides, polyethylene, and phenolic resins. The citations also examine continuous extrusion of paper composites and measurement of internal die pressure distribution during pultrusion of thermoplastic composite.

NTIS

Bibliographies; Pultrusion; Extruding; Resin Matrix Composites

19980003316 Technische Univ., Group of Mechanics and Structures, Delft, Netherlands

Interface Element for Crack Modelling in Aluminium

Hashagen, F., Technische Univ., Netherlands; 1997; 77p; In English

Report No.(s): PB97-185532; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

An interface element is described with a topology that corresponds to that of a solid-like shell element. The application of interface elements make crack modelling in aluminum possible and is a first step toward a three-dimensional numerical model for simulating the interaction between cracking and delamination in Fibre Metal Laminates. Based on a plasticity formalism cracking is modelled by the introduction of a von Mises-type yield criterion. First, hardening occurs, which is modelled by an increasing value of the equivalent stress. Finally, cracking is modelled by a rapid decrease of the equivalent stress. The performance of the element and the crack model are demonstrated by some benchmark tests and comparisons with experimental results.

NTIS

Aluminum; Mathematical Models; Fiber Composites; Metal Matrix Composites; Cracking (Fracturing); Three Dimensional Models

19980003335 NASA Lewis Research Center, Cleveland, OH USA

Health Monitoring System for Composite Structures

Tang, S. S., Structural Integrity Associates, Inc., USA; Riccardella, P. C., Structural Integrity Associates, Inc., USA; Andrews, R. J., Dayton Univ. Research Inst., USA; Grady, J. E., NASA Lewis Research Center, USA; Mucciaradi, A. N., Infometrics, Inc., USA; 1996; 11p; In English

Report No.(s): NASA/CR-97-113011; NAS 1.26:113011; AIAA Paper 96-1305; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

An automated system was developed to monitor the health status of composites. It uses the vibration characteristics of composites to identify a component's damage condition. The vibration responses are characterized by a set of signal features defined in the time, frequency and spatial domains. The identification of these changes in the vibration characteristics corresponding to different health conditions was performed using pattern recognition principles. This allows efficient data reduction and interpretation of vast amounts of information. Test components were manufactured from isogrid panels to evaluate performance of the monitoring system. The components were damaged by impact to simulate different health conditions. Free vibration response was induced by a tap test on the test components. The monitoring system was trained using these free vibration responses to identify three different health conditions. They are undamaged vs. damaged, damage location and damage zone size. High reliability in identifying the correct component health condition was achieved by the monitoring system.

Author

Health; Composite Structures; Free Vibration; Damage; Domains; Pattern Recognition; Data Reduction

19980003776 NERAC, Inc., Tolland, CT USA

Microlaminates (Latest citations from METADEX)

Nov. 1996; In English; Page count unavailable

Report No.(s): PB97-851604; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the fabrication, testing, and evaluation of laminated microstructures. Covered are methods of synthesis and fabrication including electrosynthesis, ion plating, sputtering, vacuum deposition, and low pressure plasma spraying. Investigations of mechanical and electrical properties are discussed.

NTIS

Bibliographies; Laminates; Evaluation; Fabrication; Composite Materials

19980003806 NERAC, Inc., Tolland, CT USA

Coupling Agents (Latest citations from Engineered Materials Abstracts)

Oct. 1996; In English; Page count unavailable

Report No.(s): PB97-850960; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning coupling agents, or sizing agents, for composite materials. Sizing agents discussed are primarily silanes, but amideimides, titanates, and zircoaluminates are included. Tows, fibers, and fillers are covered. Sizing compositions, applications, and their effects on physical and mechanical properties of composite materials are discussed.

NTIS

Bibliographies; Composite Materials; Sizing Materials; Coupling

19980003818 NERAC, Inc., Tolland, CT USA

Metal Matrix Composites: Latest citations from the US Patent Bibliographic File with Exemplary Claims

Oct. 1996; In English; Page count unavailable, Supersedes PB96-851977.

Report No.(s): PB97-850531; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning methods and equipment for manufacturing metal matrix composites. Various matrix composites are described, including aluminium, magnesium, ceramic-metal, titanium, boron, and fiber reinforced. Matrix techniques include rapid solidification, infiltration process, and investment casting. Composites for use in electronic packages, gas turbines, combustion engines, antennae, detectors, aerospace vehicles, and semiconductor devices are presented.

NTIS

Bibliographies; Metal Matrix Composites; Manufacturing

19980003855 NERAC, Inc., Tolland, CT USA

Preparation of Nanocomposites: Latest citations from the INSPEC Database

Aug. 1996; In English; Page Count Unavailable

Report No.(s): PB96-872817; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning technologies used in the preparation of nanocomposites. Citations cover ball milling, chemical vapor deposition, colloid-colloid reaction, combustion synthesis, laser-aerosol interaction, and sol-gel methods among others. Materials referenced include iron oxides, magnesium oxides, silicon nitrides, tungsten alloys, and zirconium oxides. Nanoparticles, nanocrystals, and nanofabrication techniques are covered in separate bibliographies. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Crystal Growth; Crystals; Bibliographies

19980003876 NERAC, Inc., Tolland, CT USA

Automation in Processing Composites: Forming. (Latest citations from Engineered Materials Abstracts)

Jan. 1997; In English; Page count unavailable. Supersedes PB96-863121

Report No.(s): PB97-855019; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning automated forming techniques used in composite materials processing. Citations discuss automated diaphragm forming, thermoforming, and deep-drawing of composite structures. The use of robots to lay tow, tape, and fiber are included. Automated preforming, pultrusion and lay-up are also discussed. Automation in the molding of composite materials and in the testing and quality control of composite materials is covered in separate bibliographies. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Forming Techniques; Composite Structures

25

INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry. For related information see also 77 Thermodynamics and Statistical Physics.

19980002440 Brookhaven National Lab., Upton, NY USA

Concentration increases in the isotopic germanium carrier solutions inferred from solution weights

Rowley, J. K., Brookhaven National Lab., USA; Jul. 1997; 11p; In English

Contract(s)/Grant(s): DE-AC02-76CH-00016

Report No.(s): BNL-64580; DE97-008221; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Concentration increases in the isotopic germanium carrier solutions via evaporation would produce weight losses in the carrier solutions. Since the bottle containing each carrier is usually weighed before and after the removal of carrier for a given run, the possibility exists of finding evidence for increasing carrier concentration in this record. With few exceptions the weighings were performed on the same top-loading balance in the external chemistry lab. The primary purpose was to monitor carrier usage, not to look for evidence for increasing carrier concentration. However, in order to look for this evidence, it is necessary only to compare the weights of the closed bottles between the times of carrier removal. This comparison has been performed and is

reported here. Bear in mind that there is some evidence that the bottle containing carrier was not always weighted in the same way (e.g. perhaps a plastic bag was not removed from the bottle or the bottle cap was removed before weighing). Another possible source of weighing errors is the occasional buildup of static charges, especially on dry winter days. Such problems of static electricity were easily recognized and overcome. For the most part, the resulting record agrees with the assumption that the weighings were performed consistently. Carrier solution data were analyzed and a correction factor was calculated.

DOE

Isotopes; Carrier Density (Solid State); Germanium

19980002461 Sandia National Labs., Albuquerque, NM USA

Error analysis of quartz crystal resonator applications

Lucklum, R., Otto-von-Guericke Univ., Germany; Behling, C., Otto-von-Guericke Univ., Germany; Hauptmann, P., Otto-von-Guericke Univ., Germany; Cernosek, R. W., Sandia National Labs., USA; Martin, S. J., Sandia National Labs., USA; [1996]; 5p; In English; 9th; International Conference on Solid-state Sensors and Actuators, 16-19 Jun. 1997, Chicago, IL, USA; Sponsored in part by Government of Germany.

Contract(s)/Grant(s): DE-AC04-94AL-85000; Lu605/2-1; 01 RA 9603/1

Report No.(s): SAND-96-2963C; CONF-970646-8; DE97-005369; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

Quartz crystal resonators in chemical sensing applications are usually configured as the frequency determining element of an electrical oscillator. By contrast, the shear modulus determination of a polymer coating needs a complete impedance analysis. The first part of this contribution reports the error made if common approximations are used to relate the frequency shift to the sorbed mass. In the second part, the authors discuss different error sources in the procedure to determine shear parameters.

DOE

Quartz Crystals; Resonators; Error Analysis

19980002501 Sandia National Labs., Albuquerque, NM USA

Ion exchange properties of novel hydrous metal oxide materials

Gardner, T. J., Sandia National Labs., USA; McLaughlin, L. I., Sandia National Labs., USA; [1996]; 7p; In English; Spring Meeting of the Materials Research Society (MRS), 8-12 Apr. 1996, San Francisco, CA, USA

Contract(s)/Grant(s): DE-AC04-94AL-85000

Report No.(s): SAND-96-0170C; CONF-960401-72; DE97-004204; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

Hydrous metal oxide (HMO) materials are inorganic ion exchangers which have many desirable characteristics for catalyst support applications, including high cation exchange capacity, anion exchange capability, high surface area, ease of adjustment of acidity and basicity, bulk or thin film preparation, and similar chemistry for preparation of various transition metal oxides. Cation exchange capacity is engineered into these materials through the uniform incorporation of alkali cations via manipulation of alkoxide chemistry. Specific examples of the effects of Na stoichiometry and the addition of SiO₂ to hydrous titanium oxide (HTO) on ion exchange behavior will be given. Acid titration and cationic metal precursor complex exchange will be used to characterize the ion exchange behavior of these novel materials.

DOE

Ion Exchanging; Metal Oxides

19980002509 Environmental Protection Agency, Office of Ground Water and Drinking Water, Cincinnati, OH USA

Manual for the Certification of Laboratories Analyzing Drinking Water: Criteria and Procedures Quality Assurance

Mar. 1997; 192p; In English

Report No.(s): PB97-171490; EPA/815/B-97/001-Rev; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche

This manual is intended to assist EPA in implementing 40 CFR 142.10(b)(4) by specifying criteria and procedures for certifying principal State laboratories. Chapter 2 describes the responsibilities of each of the parties involved in the certification program. Chapter 3 describes how the program operates. Chapters 4, 5, and 6 cover the technical criteria to be used during the on-site evaluation of a laboratory for chemistry, microbiology, and radiochemistry, respectively. Optional audit forms are also included in Chapters 4, 5 and 6. The appendices include: a recommended protocol and format for conducting on-site laboratory evaluations, which may be used by the laboratory auditors; frequently used abbreviations and definitions; EPA's policy on third-party auditors; a list of contaminants a principal State laboratory must have the capability to analyze; a list of contaminants in proposed rules; a list

of unregulated chemicals for which systems must monitor under section 1445 of the Safe Drinking Water Act; optional record keeping and data audit procedures; and recommended chain-of-custody procedures to be used if necessary.

NTIS

Potable Water; Manuals; Laboratories; Certification

19980002671 Argonne National Lab., IL USA

Application of metallic nanoparticle suspensions in advanced cooling systems

Lee, S., Argonne National Lab., USA; Choi, S. U. S., Argonne National Lab., USA; [1996]; 9p; In English; 1996 International Mechanical Engineering Congress and Exhibition, 17-22 Nov. 1996, Atlanta, GA, USA

Contract(s)/Grant(s): W-31-109-eng-38

Report No.(s): ANL/ET/CP-90558; CONF-961105-20; DE97-003881; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

In the development of energy-efficient heat transfer fluids that are required in many cooling applications, low thermal conductivity is a primary limitation. However, it is well known that at room temperature, metals in solid form have orders-of-magnitude higher thermal conductivities than those of fluids. Therefore, the thermal conductivities of fluids that contain suspended solid metallic particles are expected to be significantly enhanced over those of conventional heat transfer fluids. In fact, numerous theoretical and experimental studies of the effective thermal conductivity of dispersions that contain solid particles have been conducted since Maxwell's theoretical was published more than 100 years ago. However, all of the studies on thermal conductivity of suspensions have been confined to millimeter- or micrometer-sized particles.

DOE

Thermal Conductivity; Room Temperature; Millimeter Waves; Cooling Systems; Conductivity

19980002680 Rensselaer Polytechnic Inst., Materials Science & Engineering Dept., Troy, NY USA

Kinetics of Diffusional Droplet Growth in a Liquid/Liquid Two-Phase System Final Report

Glicksman, M. E., Rensselaer Polytechnic Inst., USA; Fradkov, V. E., Rensselaer Polytechnic Inst., USA; Jun. 30, 1996; 24p; In English

Contract(s)/Grant(s): NCC8-54; NSF DMR-93-07725

Report No.(s): NASA/CR-97-205833; NAS 1.26:205833; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

We address the problem of diffusional interactions in a finite sized cluster of spherical particles for volume fractions, $V(\text{sub } v)$ in the range 0-0.01. We determined the quasi-static monopole diffusion solution for n particles distributed at random in a continuous matrix. A global mass conservation condition is employed, obviating the need for any external boundary condition. The numerical results provide the instantaneous (snapshot) growth or shrinkage rate of each particle, precluding the need for extensive time-dependent computations. The close connection between these snapshot results and the coarsegrained kinetic constants are discussed. A square-root dependence of the deviations of the rate constants from their zero volume fraction value is found for the higher $V(\text{sub } v)$ investigated. This behavior is consistent with predictions from diffusion Debye-Huckel screening theory. by contrast, a cube-root dependence, reported in earlier numerical studies, is found for the lower $V(\text{sub } v)$ investigated. The roll-over region of the volume fraction where the two asymptotics merge depends on the number of particles, n , alone. A theoretical estimate for the roll-over point predicts that the corresponding $V(\text{sub } v)$ varies as $n(\text{sup } -2)$, in good agreement with the numerical results.

Author

Kinetics; Diffusion Theory; Drops (Liquids); Binary Systems (Materials)

19980002892 Toledo Univ., Dept. of Mechanical, Industrial and Manufacturing Engineering, OH USA

Computation of Reacting Flows in Combustion Processes Final Report

Keith, Theo G., Jr., Toledo Univ., USA; Chen, Kuo-Huey, Toledo Univ., USA; Dec. 1997; 8p; In English

Contract(s)/Grant(s): NAG3-1219

Report No.(s): NASA/CR-97-112950; NAS 1.26:112950; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

The main objective of this research was to develop an efficient three-dimensional computer code for chemically reacting flows. The main computer code developed is ALLSPD-3D. The ALLSPD-3D computer program is developed for the calculation of three-dimensional, chemically reacting flows with sprays. The ALL-SPD code employs a coupled, strongly implicit solution procedure for turbulent spray combustion flows. A stochastic droplet model and an efficient method for treatment of the spray source terms in the gas-phase equations are used to calculate the evaporating liquid sprays. The chemistry treatment in the code is general enough that an arbitrary number of reaction and species can be defined by the users. Also, it is written in generalized curvilinear coordinates with both multi-block and flexible internal blockage capabilities to handle complex geometries. In addition, for general industrial combustion applications, the code provides both dilution and transpiration cooling capabilities. The

ALLSPD algorithm, which employs the preconditioning and eigenvalue rescaling techniques, is capable of providing efficient solution for flows with a wide range of Mach numbers. Although written for three-dimensional flows in general, the code can be used for two-dimensional and axisymmetric flow computations as well. The code is written in such a way that it can be run in various computer platforms (supercomputers, workstations and parallel processors) and the GUI (Graphical User Interface) should provide a user-friendly tool in setting up and running the code.

Author

Reacting Flow; Computer Programs; Graphical User Interface; Three Dimensional Flow; Mach Number; Computational Fluid Dynamics

19980002911 National Inst. of Standards and Technology, Electromagnetic Fields Div., Boulder, CO USA

Intercomparison of Permeability and Permittivity Measurements Using the Transmission/Reflection Method in 7 and 14 mm Coaxial Air Lines

Weil, Claude M., National Inst. of Standards and Technology, USA; Janezic, Michael D., National Inst. of Standards and Technology, USA; Vanzura, Eric J., National Inst. of Standards and Technology, USA; Mar. 1997; 53p; In English

Report No.(s): PB97-161541; NIST/TN-1386; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The authors discuss a measurement intercomparison, designed as a follow-up to that reported by Vanzura et al. In this effort, 13 participants performed broadband (3 MHz to 10 GHz) measurements of the magnetic and dielectric properties of five different ferrite samples using the transmission/reflection (T/R) method in 7 and 14 mm diameter coaxial air lines. Agreement within 5 percent was obtained for the measured permeability data for frequencies between 50 and 100 MHz. However, consistent with the findings of the earlier study, significant variability (15 percent) was found to exist in the permittivity data, due to air-gap effects.

NTIS

Transmission Lines; Electrical Measurement; Permeability; Permittivity; Ferrites

19980003302 Washington Univ., Dept. of Mechanical Engineering, Seattle, WA USA

Investigation of the Flamelet Modeling of Turbulent Combustion. Topical Report (A Task 1 Report), Sep. 1995 - Sep. 1996

debruyneKops, S. M., Washington Univ., USA; Kosaly, G., Washington Univ., USA; Riley, J. J., Washington Univ., USA; Mar. 15, 1997; 40p; In English

Report No.(s): PB97-161236; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Turbulent flow dynamics are often critical in combustion processes because, in non-premixed reactions, the rate of product formation is usually controlled by the ability of the turbulence to mix the reacting species down to the microscale. The authors examine a class of closure models known as 'flamelet' models. The investigation is based on data from Direct Numerical Simulations (DNS) and on theoretical analysis of the physical conditions; the Conditional Moment Closure (CMC) model, Stationary Laminar Flamelet Model (SLFM), and Strained Dissipation and Reaction Layer (SDRL) model are analyzed. In addition, a new derivation of SLFM, based on the CMC approach, is presented. The derivation helps in the understanding of the assumptions underlying the SLFM and SDRL models.

NTIS

Combustion Chemistry; Turbulent Combustion; Flame Propagation; Mathematical Models; Turbulent Flow; Reacting Flow; Turbulent Mixing; Premixing

19980003417 NERAC, Inc., Tolland, CT USA

Surface Analysis by Secondary Ion Mass Spectroscopy: (Latest citations from World Surface Coatings Abstracts)

Feb. 1997; In English; Page count unavailable. Supersedes PB96-853486

Report No.(s): PB97-856215; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the use of secondary ion mass spectroscopy (SIMS) for surface analysis of organic materials. The basic principles and the major advantages and disadvantages of SIMS are discussed. Topics include applications in the field of adsorption as well as polymer analysis. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Secondary Ion Mass Spectrometry; Organic Materials; Surface Properties

19980003833 Central Inst. of Aviation Motors, Moscow, Russia

The Kinetic Nonequilibrium Processes in the Internal Flow and in the Plume of Subsonic and Supersonic Aircrafts, 28 Aug. 1996 - 28 Aug. 1997

Starik, Alexander M., Central Inst. of Aviation Motors, Russia; 1997; 38p; In English

Contract(s)/Grant(s): NAG3-1957

Report No.(s): NASA/CR-97-206449; NAS 1.26:206449; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

(1) Our results show that under combustion of thermal destruction products of n-C₈H₁₈, and other hydrocarbon fuels with air at the equivalent ratio -0.5 and less the chemical equilibrium is not realized at the exit plane of combustion chamber and in the gas turbine and nozzle for most of small components such as NO₂, NO₃, HNO, HNO₂, HNO₃, N(x)H(y), HO₂, OH. The chemical equilibrium is not realized in the internal flow of ramjet hydrogen combustion engine too. So at the nozzle exit plane both of gas-turbine hydrocarbon combustion engine and of ramjet hydrogen combustion engine the relatively large values of concentration of such small components as NO₃, HNO₂, N₂O, HNO₃, HNO, NH, N₂H, HO₂, H₂O₂ may be realized. The exact definition of these component concentration as well as concentration of NO(x), OH, SO₂, O, H, H₂, H₂O at the nozzle exit plane is very important for plume chemistry. (2) The results which were obtained for subsonic and hypersonic aircrafts indicate on the considerable change of the composition of the gas mixture along the plume. This change can be caused not only by the mixture of combustion products with the atmosphere air but by proceeding of whole complex of nonequilibrium photochemical reactions. The photodissociation processes begin to influence on the formation of the free atoms and radicals at flight altitude H greater than or equal to 18 km. Neglect of these processes can result in essential (up to 10(exp 4) times) mistakes of values gamma(sub OH), gamma(sub O), gamma(sub H), gamma(sub HSO₃) and some products of CFC's disintegration. It was found that penetration of CL-containing species from the atmosphere into the exhaust flow and its interaction with nitrogen oxides leads to essential increasing of the concentration of Cl, Cl₂, ClO₂, ClNO₃, CH₃Cl and sometimes HCl and the decreasing of ClO concentration by comparison with background values. The results of our analysis show that the plume aircraft with both hydrocarbon and hydrogen combustion engine may be source of various pollutant components such as HNO, HNO₄, ClO₂, CH₃NO₂, CH₃NO₃, CH₂O, Cl, H₂O₂, but not only NO, NO₂, HNO₂, HNO₃, N₂O₅, SO₂, SO₃, H₂SO₄ as it was supposed before.

Author

Nonequilibrium Conditions; Kinetics; Internal Flow; Plumes; Hypersonics; Supersonic Aircraft

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METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

19980002437 Oak Ridge National Lab., TN USA

High temperature corrosion behavior of iron-aluminide alloys and coatings

Tortorelli, P. F., Oak Ridge National Lab., USA; Pint, B. A., Oak Ridge National Lab., USA; Wright, I. G., Oak Ridge National Lab., USA; [1997]; 12p; In English; 11th; Annual Conference on Fossil Energy Materials, 20-22 May 1997, Knoxville, TN, USA
Contract(s)/Grant(s): DE-AC05-96OR-22464

Report No.(s): CONF-9705115-2; DE97-007778; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The long-term oxidation performance of ingot- and powder-processed Fe-28 at.% Al-(2--5)% Cr alloys with minor oxygen-active element or oxide additions was characterized for exposures in air at 1,000--1,300 C. Additions of zirconium or yttria substantially improved the adhesion of alumina scales grown on iron aluminides. At lower temperatures, the ingot-processed alloys performed similarly to ODS Fe(sub 3)Al alloys and other alumina-formers. However, at 1,200 and 1,300 C, the oxidation resistance of the ingot-processed Fe(sub 3)Al was degraded due to deformation of the substrate and some localized reaction product growth. Other oxidation experiments showed that the addition of an oxide dispersion to iron aluminides reduced the critical aluminum concentration for protective alumina scale formation. Oxide-dispersion-strengthened Fe(sub 3)Al alloys made from commercially prepared powders and an iron-aluminide coating with 21% Al and 1% Cr, prepared by a gas metal arc weld-overlay techniques, showed excellent oxidation/sulfidation resistance.

DOE

Oxide Dispersion Strengthening; Aluminum Alloys; Arc Welding; Iron Alloys; Yttrium Oxides

19980002456 Oak Ridge National Lab., TN USA

A model for the yield strength anomaly in FeAl

Baker, I., Dartmouth Coll., USA; George, E. P., Oak Ridge National Lab., USA; [1996]; 8p; In English; 1996 Fall Meeting of the Materials Research Society (MRS), 2-6 Dec. 1996, Boston, MA, USA

Contract(s)/Grant(s): DE-AC05-96OR-22464; DE-FG02-87ER-45311; DE-AC05-76OR-00033

Report No.(s): CONF-961202-70; DE97-003112; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

A phenomenological model is used to explain the yield strength anomaly in FeAl. The model incorporates hardening by thermal vacancies at intermediate temperatures, and dislocation creep at elevated temperatures. Since the vacancy concentration increases exponentially with temperature, the model predicts an exponential increase in strength with temperature. This increase is terminated by onset of dislocation creep. The model captures the experimentally observed strain rate dependency of the yield stress at high temperatures and yields an activation enthalpy for vacancy formation which is in excellent agreement with a previously measured value.

DOE

Yield Strength; Iron Alloys; Aluminum Alloys; Models; Intermetallics

19980002469 Brookhaven National Lab., Upton, NY USA

Investigation of the altered layer on ancient Chinese bronze mirrors and model high-tin bronzes

Taube, M., State Univ. of New York, USA; King, A. H., State Univ. of New York, USA; Chase, T. C., III, Smithsonian Institution, USA; 1996; 7p; In English; 1996 Fall Meeting of the Materials Research Society (MRS), 2-6 Dec. 1996, Boston, MA, USA

Contract(s)/Grant(s): DE-AC02-76CH-00016

Report No.(s): BNL-64018; CONF-961202-99; DE97-004075; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Many ancient Chinese bronze mirrors have a smooth patina. An ingress of corrosion to a depth of approximately 100 micron is found beneath the patina. The corrosion selectively replaces the Cu-rich (alpha) phase leaving the Sn-rich (delta) phase intact. Previous work by x-ray diffraction has shown that the (alpha)-phase replacement product is poorly crystallized on nanocrystalline SnO₂. Transmission electron microscopy was employed to further characterize the replacement product in both ancient mirror and replication samples. Nanocrystalline SnO₂ in the form of small spheroids has been found. Remnants of an original alloy phase appear to be interspersed with the tin oxide.

DOE

Bronzes; Mirrors; Surface Layers

19980002474 Los Alamos National Lab., NM USA

High temperature oxidation of Ni₅₀(Al,Be)₅₀

Hanrahan, R. J., Jr., Los Alamos National Lab., USA; Butt, D. P., Los Alamos National Lab., USA; Thoma, D. J., Department of Energy, USA; Taylor, T. N., Los Alamos National Lab., USA; Maggiore, C. J., Los Alamos National Lab., USA; [1996]; 8p; In English; 13th; International Corrosion Congress, 25-29 Nov. 1996, Melbourne, Australia

Contract(s)/Grant(s): W-7405-eng-36

Report No.(s): LA-UR-96-3187; CONF-9611128-1; DE96-014927; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Effect of Be on high-temperature oxidation of NiAl was investigated. From 1 to 10% Be was substituted for Al on a 1 to 1 atomic basis. Oxidation experiments were conducted in pure oxygen. Exposure temperatures ranged from 800 to 1200 C for 16 hours. In addition to thermogravimetry, postexposure analysis involved SEM of intact scales, XRD, XPS, and Rutherford back-scattering spectroscopy. At every temperature tested, the Be modified NiAl containing 1, 2, or 5 at.% Be exhibited lower weight gain and comparable or slower oxidation rates than the pure binary material. The surfaces of the Be modified specimens showed minimal topography, with no evidence of the usual transient alumina phases grown on binary NiAl in this temperature range. XRD and surface analysis showed the presence of layers of Al₂O₃ and ternary oxide phases, primarily BeO*Al₂O₃. The growth of this complex scale apparently prevents growth of the transient alumina phases.

DOE

Oxidation; Nickel Alloys; Aluminum Alloys; Beryllium

19980002486 Helsinki Univ. of Technology, Lab. of Metallurgy, Otaniemi, Finland

Plasma technology in metallurgical processing

Haile, O., Helsinki Univ. of Technology, Finland; 1995; 31p; In English

Report No.(s): TKK-V-B109; DE97-711420; ISBN 951-22-2820-3; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

This literature work is mainly focusing on the mechanisms of plasma technology and telling about metallurgical processing, particularly iron and steel making as well as the advantage of the unique properties of plasma. The main advantages of plasma technology in metallurgical operations is to direct utilization of naturally available raw materials and fuels without costly upgrading and/or beneficiation, improved environmental impact, improve process control, significant amplification of reactor and process equipment utilization and increased efficiency of raw materials, energy and man power. This literature survey is based on the publication 'plasma technology in metallurgical processing' presents a comprehensive account of the physical, electrical, and mechanical aspects of plasma production and practical processing. The applications of plasma technology in metallurgical processing are covered in depth with special emphasis on developments in promising early stages. Plasma technology of today is mature in the metallurgical process applications. A few dramatic improvements are expected in the near future this giving an impetus to the technologists for the long range planning.

DOE

Steels; Surveys; Iron

19980002507 Oak Ridge National Lab., TN USA

Low-cost metal substrates for films with aligned grain structures

Norton, D. P., Oak Ridge National Lab., USA; Budai, J. D., Oak Ridge National Lab., USA; Goyal, A., Oak Ridge National Lab., USA; Lowndes, D. H., Oak Ridge National Lab., USA; Kroeger, D. M., Oak Ridge National Lab., USA; Christen, D. K., Oak Ridge National Lab., USA; Paranthaman, M., Oak Ridge National Lab., USA; Specht, E. D., Oak Ridge National Lab., USA; Jun. 1996; 8p; In English; Future Generation Photovoltaic Technologies, 24-26 Mar. 1997, Denver, CO, USA

Contract(s)/Grant(s): DE-AC05-96OR-22464

Report No.(s): CONF-970396-1; DE97-007762; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Polycrystalline metal substrates that possess a significant amount of in-plane and out-of-plane crystallographic texture have recently been developed for high-temperature superconducting film applications. These substrates enable the virtual elimination of large angle grain boundaries in subsequent epitaxial films, having been successfully utilized in various oxide thin film architectures. This paper describes the characteristics of these substrates, and briefly discusses their potential applicability in polycrystalline thin-film photovoltaic applications.

DOE

High Temperature Superconductors; Crystallography; Epitaxy; Grain Boundaries; Polycrystals; Superconducting Films

19980002515 NERAC, Inc., Tolland, CT USA

Cryogenic Aging of Metals: Latest citations from the Ei Compindex*Plus database

Feb. 1997; In English

Report No.(s): PB97-855555; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the behaviour of metals at low temperatures. Citations discuss the kinetics of precipitates as well as mechanical properties such as ductility and fatigue. Also discussed are practical applications of cryogenically treated metals, particularly in the electronics industry. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Aging (Metallurgy); Metals

19980002644 NERAC, Inc., Tolland, CT USA

Metals Recovery from Wastes. (Latest citations from METADEX)

Jan. 1997; In English; Page count unavailable. Supersedes PB96-863709

Report No.(s): PB97-855225; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the recovery and recycling or reuse of ferrous and nonferrous metals from various industrial wastes. Types of waste considered include waste water, sludge, scrap, battery waste, and waste liquors. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Industrial Wastes; Materials Recovery; Metals

19980002662 Lockheed Martin Energy Systems, Inc., Oak Ridge, TN USA

Microstructure of V-4Cr-4Ti following low temperature neutron irradiation

Rice, P. M., Lockheed Martin Energy Systems, Inc., USA; Snead, L. L., Lockheed Martin Energy Systems, Inc., USA; Alexander, D. J., Lockheed Martin Energy Systems, Inc., USA; Zinkle, S. J., Lockheed Martin Energy Systems, Inc., USA; [1996]; 6p; In English; Materials Research Society on Waste Management, 2-4 Nov. 1996, Boston, MA, USA

Contract(s)/Grant(s): DE-AC05-96OR-22464

Report No.(s): CONF-9611125-2; DE97-003090; No Copyright; Avail: Issuing Activity (Nat'l Technical Information Service (NTIS)), Microfiche

The V-4Cr-4Ti alloys display excellent mechanical properties, including a ductile-to-brittle transition temperature (DBTT) below -200 C in the unirradiated conditions. Samples were fission neutron-irradiated in HFBR to a 0.4 dpa dose at 100-275 C. Mechanical tests showed significant irradiation hardening which increased with irradiation temperature. Charpy impact testing also showed a dramatic increase in DBTT on the order of 100 to 350 C. The mechanical property changes are correlated with preliminary results from TEM analysis of the defect microstructure resulting from the low-dose neutron irradiations. TEM of the irradiated material showed a nearly constant defect density of approx. $1.6 \times 10^{23} \text{ m}^{-3}$, with an average defect diameter of slightly greater than 3 nm.

DOE

Neutron Irradiation; Microstructure; Vanadium Alloys; Chromium Alloys; Titanium Alloys; Charpy Impact Test; Radiation Effects

19980002682 Japan Atomic Energy Research Inst., Tokyo, Japan

Creep rupture properties of a Ni-Cr-W superalloy in air environment

Kurata, Yuji, Japan Atomic Energy Research Inst., Japan; Tsuji, Hirokazu, Japan Atomic Energy Research Inst., Japan; Shindo, Masami, Japan Atomic Energy Research Inst., Japan; Nakajima, Hajime, Japan Atomic Energy Research Inst., Japan; Oct. 1996; 53p; In Japanese

Report No.(s): JAERI-Research-96-052; DE97-729534; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Creep rupture properties in air environment were investigated at 900, 1000 and 1050 C using bar, plate and seamless tube materials of a Ni-Cr-W superalloy developed for use at service temperatures around 1000 C. Long-term creep rupture strength was estimated applying the time-temperature parameter method to creep rupture data. The results obtained were as follows: (1) Master rupture curves with optimized parameters for this Ni-Cr-W superalloy were obtained applying Larson-Miller parameter method and Orr-Sherby-Dorn parameter method. Larson-Miller parameter method is better than Orr-Sherby-Dorn parameter method in respect of curve fitting to the present creep-rupture data; (2) Abnormal creep where creep rates decreased in a tertiary creep stage was observed in creep curves at 1000 C with rupture times above 10,000 h. This phenomenon was caused by the suppression of crack propagation due to oxide formed at crack tips. Correction for abnormal creep was carried out; (3) The creep rupture strength for a 1×10^5 h life at 1000 C was predicted for each material using master rupture curves with optimized parameters. As a result, it was shown that the creep rupture strength of the bar material with grain sizes above ASTM No.2 and of the plate material is above 9.8 MPa for a 1×10^5 h life at 1000 C, which was the target on creep rupture strength of this program; and (4) Creep rupture strength increases with increasing grain diameter and heat treatment temperature.

DOE

Creep Rupture Strength; Heat Resistant Alloys; Grain Size; Temperature Dependence

19980002701 Joint Inst. for Nuclear Research, Lab. of Nuclear Reactions, Dubna, USSR

Mechanical property changes and microstructures of austenitic stainless steel OX18H10T, irradiated by energetic heavy ions and neutrons ($E_{\text{sub } n}$ greater than 0.1 MeV) *Izmenenie mekhanicheskikh svoystv i mikrostruktury austenitnoj nerzhavyushchej stali OX18N10T, obluchennoj vysokoenergeticheskimi ionami i nejtronami ($E_n > 0.1 \text{ MeV}$)*

Hofman, A., Institute of Nuclear Research, Poland; Kochanski, T., Institute of Nuclear Research, Poland; Didyk, A. Yu., Joint Inst. for Nuclear Research, USSR; Shchegolev, V. A., Joint Inst. for Nuclear Research, USSR; 1996; 21p; In Russian

Report No.(s): JINR-R-14-96-274; DE97-621711; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

The results of radiation hardening and the microstructural evolution in OX18N10T austenitic stainless steel irradiated by neon (with 230 MeV energy) heavy ions and neutron ($E_{\text{sub } n}$ greater than 0.1 MeV) have been investigated. The irradiation experiments were carried out on an external beam of the U-400 cyclotron in Dubna and in the reactor EWA (Institute of Atomic Energy, Otwock-Swierk). The dose dependence of the change of mechanical properties was determined. The Transmission Electron

Microscope (TEM) has been used to characterize the microstructural changes and dependence of radiation defects density on the dose. The discussion of mechanical property changes and the microstructure research is carried out.

DOE

Irradiation; Radiation Hardening; Austenitic Stainless Steels

19980002727 NERAC, Inc., Tolland, CT USA

Cryogenic Treatment of Steels. (Latest citations from METADEX)

Jan. 1997; In English; Page count unavailable. Supersedes PB96-864848

Report No.(s): PB97-855324; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the use of cryogenic temperatures to improve the properties of steels. Stainless steels, tool steels, electrical steels, and metal matrix composites are discussed. Citations cover fatigue life, wear resistance, tool life, and increased high temperature ductility. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Cryogenics; Steels; Cold Hardening

19980002804 NERAC, Inc., Tolland, CT USA

Surface Hardening of Steel by Laser and Electron Beam: Latest citations from METADEX

Aug. 1996; In English; Page Count Unavailable

Report No.(s): PB96-873245; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning electron beam hardening of steels and alloys. Among the materials surface hardened are carbon and alloy steels, aircraft spur gears, nitrocarburized steel, turbine blades, titanium-carbon steel, titanium, and rolling bearings. Effect of transformation plasticity on residual stress fields in laser surface hardening treatment is also examined.

NTIS

Stress Distribution; Surface Treatment; Residual Stress; Laser Beams; Electron Beams

19980002811 International Centre for Theoretical Physics, Trieste, Italy

The influences of induced elastic fields on permeation of hydrogen in Palladium and Palladium alloys

Kandasamy, K., International Centre for Theoretical Physics, Italy; Lewis, F. A., Queens Univ., UK; Apr. 1997; 11p; In English Report No.(s): IC/IR-97/7; DE97-627421; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

Recent hydrogen permeation studies on palladium and palladium alloys have provided definite evidence for the influence of diffusion induced elastic stress on permeation processes. Such influence will introduce an important factor in estimations of chemical diffusion coefficient and solubility of hydrogen in these metals using permeation results. Complications due to correlated space-time variation of induced elastic stress and dissolved hydrogen concentration make an assessment of error in such estimation difficult. A complete theoretical account of the effects induced elastic stress on hydrogen permeation is not yet available. In the present work, an approximate space-time variation of hydrogen concentration is assumed. Using this concentration, variations of flux and pressure with time are computed. General agreements of these computed variations with experimental results are indicated. Possible effects of dissolved hydrogen in metallic membranes and average hydrogen concentration gradients imposed on the permeation processes are discussed.

DOE

Palladium Alloys; Permeating; Palladium; Gaseous Diffusion; Hydrogen

19980002883 NERAC, Inc., Tolland, CT USA

Stress Corrosion of Steel: Latest citations from the NTIS Bibliographic Database

Sep. 1996; In English; Page Count Unavailable

Report No.(s): PB96-873443; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the laboratory and field investigations of stress corrosion characteristics of steel and steel products. Topics include crack propagation, effects of additives, and embrittlement characterization. The stress cor-

rosion of reactor pressure vessels, petroleum production equipment, and waste disposal containers is reviewed. Citations pertaining specifically to stainless steel are not included.(Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Stress Corrosion; Bibliographies; Steels

19980002973 NERAC, Inc., Tolland, CT USA

Extrusion of Aluminum Alloys: Latest citations from METADEX

Aug. 1996; In English; Page Count Unavailable

Report No.(s): PB96-872981; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning extrusion techniques for aluminum including hot extruding, cold extruding, backward extruding, forward extruding and hydrostatic extruding. Extrusion equipment is evaluated and properties of extruded parts are addressed.

NTIS

Bibliographies; Extruding; Aluminum Alloys

19980003413 NERAC, Inc., Tolland, CT USA

Ladle and Vacuum Refining of Nonferrous Metals. (Latest citations from METADEX)

Jan. 1997; In English; Page count unavailable. Supersedes PB96-862834

Report No.(s): PB97-855191; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning equipment and techniques for the refining of nonferrous alloys. Vacuum degassing; high-speed inert gas injection; and the use of chemical additives for the removal of dissolved oxygen, hydrogen, and unwanted elements, are discussed.(Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Refining; Purification; Nonferrous Metals

19980003438 NERAC, Inc., Tolland, CT USA

Melting Superalloys. (Latest citations from METADEX)

Sep. 1996; In English; Page count unavailable.

Report No.(s): PB96-873567; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development of superalloys and methods used to improve their melting processes. Citations include consumable air and vacuum arc remelting, electroslog, and vacuum induction melting. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Melting

19980003754 NERAC, Inc., Tolland, CT USA

Physical and Electrical Properties of Beryllium Base Alloys. (Latest citations from METADEX)

Jan. 1997; In English; Page count unavailable. Supersedes PB96-862503

Report No.(s): PB97-854988; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the properties of beryllium base alloys. Included are discussions of magnetic, mechanical, and thermodynamic properties. Special emphasis is placed on superconductivity and magnetic susceptibility. The oxidation of beryllium base alloys in a variety of atmospheres is also reviewed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Beryllium Alloys; Electrical Properties; Physical Properties

19980003777 NERAC, Inc., Tolland, CT USA

Superplastic Forming of Aluminum: Latest citations from the Aluminum Industry Abstracts Database

Oct. 1996; In English; Page count unavailable.

Report No.(s): PB97-850200; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the structure and mechanical properties of superplastic alloys. Behavior of the materials during superplastic deformation and resulting changes are discussed. Articles also cover the process and techniques of superplastic forming, along with its different applications.

NTIS

Bibliographies; Aluminum; Data Bases; Abstracts; Mechanical Properties

19980003804 NERAC, Inc., Tolland, CT USA

Water Soluble and No-clean Solder. Technology and Processes: Latest citations from Weldasearch

Aug. 1996; In English; Page Count Unavailable

Report No.(s): PB96-871041; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning water soluble and no-clean solder technology and processes. Citations focus on recommendations, comparisons, performance optimization, reliability, and corrosion. Benchmarking, quality functional deployment (QFD), and the transition from solvents to waste to no-clean solder are also covered. Applications include hand soldering, wave soldering, thick film, surface mount technology, and flip chips. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Soldering

19980003850 NERAC, Inc., Tolland, CT USA

Bauxite Ore Treatment: Latest citations from the Ei Compendex*Plus Database

Aug. 1996; In English; Page Count Unavailable

Report No.(s): PB96-872791; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the methods for treatment of bauxite ores and the subsequent extraction of aluminum. Included are roasting, magnetic separation, flotation, leaching, and calcining. The Bayer Hall-Heroult and the Alcoa processes are discussed in both technical and economic terms. The chemical analysis of ores is emphasized, as is the removal of impurities such as iron oxides and siliceous materials. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Bauxite; Beneficiation; Minerals

19980003870 NERAC, Inc., Tolland, CT USA

Joining Copper-Beryllium Alloys (Latest citations from METADEX)

Nov. 1996; In English; Page count unavailable

Report No.(s): PB97-851562; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the joining of copper-beryllium alloys to themselves and other materials. Processes include welding, soldering, and brazing. Citations discuss the surface preparation prior to joining, operational parameters for each process, quality control, and failure analyses. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Copper Alloys; Beryllium Alloys; Bibliographies; Joining

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see 24 Composite Materials.

19980002434 NERAC, Inc., Tolland, CT USA

Recycling Plastic Scrap. Injection Molding: Latest citations from the Rubber and Plastics Research Association Database
Feb. 1997; In English

Report No.(s): PB97-855571; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the recycling of scrap plastic produced in the injection molding process. Plastic pellets made from scrap, that are used in the injection molding process, are also discussed. Recycling equipment and automated recycling systems are described. The reuse of plastic scrap culled from junk automobiles and packaging materials is discussed, and waste byproducts from polyurethane production are described. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Recycling; Injection Molding; Plastics

19980002435 Joint Inst. for Nuclear Research, Lab. of Neutron Physics, Dubna, USSR

Neutron investigations of surfaces and thin films *Issledovaniya poverkhnostej i tonkikh plenok s pomoshch'yu nejtronov*
Aksenov, V. L., Joint Inst. for Nuclear Research, USSR; 1996; 16p; In Russian

Report No.(s): JINR-R-14-96-350; DE97-622968; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

This lecture is dedicated to the principles of neutron reflectometry and the prospects it offers for investigations of magnetic and superconducting films. The theory of neutron reflection from surfaces is briefly outlined. The experiments of neutron reflection and transmission in films with a noncolinear magnetic structure, as well as measurements of the magnetic field penetration depth in superconducting films with a rough surface, are discussed.

DOE

Magnetic Films; Superconducting Films; Thin Films; Thermal Neutrons; Optical Measurement

19980002439 Oak Ridge National Lab., TN USA

Advanced ceramics for land-based gas turbine applications *Final Report*

Schneibel, J. H., Oak Ridge National Lab., USA; Ludeman, E., Oak Ridge National Lab., USA; Sabol, S. M., Oak Ridge National Lab., USA; May 23, 1997; 65p; In English

Contract(s)/Grant(s): DE-AC05-96OR-22464

Report No.(s): ORNL/M-5934; DE97-008103; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

In order to increase the efficiency of land-based gas turbines, inlet gas temperatures have to be increased, and the amount of air which cools the turbine vanes has to be reduced, to the maximum extent possible. Presently, thermal barrier coatings (TBC's) are the state of the art in achieving these goals. However, since TBC's are very thin (typically 100 (mu)m), they have clearly limitations. Since all-ceramic turbine vanes would be a very large and risky development step, Westinghouse is considering to protect the leading edges of turbine vanes with high-performance ceramics. This might be done by either replacing the leading edge with a suitably shaped ceramic part, or by modifying the vanes such that they can accommodate ceramic inserts. Among the most important criteria for the success of ceramics in such applications are (a) thermodynamic compatibility with the turbine vane alloy, (b) sufficient thermal shock resistance to survive the thermal cycling during operation and in particular during emergency shut-down, and a design considering the thermal expansion mismatch of the metallic and ceramic components. This paper presents results of work performed on SiC, SiN, and aluminas.

DOE

Aluminum Oxides; Thermal Control Coatings; Thermodynamics; Gas Temperature

19980002475 Sandia National Labs., Albuquerque, NM USA

High energy electron beam joining of ceramic components

Turman, B. N., Sandia National Labs., USA; Glass, S. J., Sandia National Labs., USA; Halbleib, J. A., Sandia National Labs., USA; 1997; 6p; In English; 11th; IEEE International Pulsed Power Conference, 29 Jun. - 2 Jul. 1997, Baltimore, MD, USA

Contract(s)/Grant(s): DE-AC04-94AL-85000

Report No.(s): SAND-97-1546C; CONF-9706113-11; DE97-006942; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

High strength, hermetic braze joints between ceramic components have been produced using high energy electron beams. With a penetration depth into a typical ceramic of (approximately) 1 cm for a 10 MeV electron beam, this method provides the capability for rapid, transient brazing operations where temperature control of critical components is essential. The method deposits energy directly into a buried joint, allowing otherwise inaccessible interfaces to be brazed. Because of transient heating, higher thermal conductivity, lower heat capacity, and lower melting temperature of braze metals relative to the ceramic materials, a pulsed high power beam can melt a braze metal without producing excessive ceramic temperatures. We have demonstrated the feasibility of this process related to ceramic coupons as well as ceramic and glass tubes. The transient thermal response was predicted, using as input the energy absorption predicted from the coupled electron-photon transport analysis. The joining experiments were conducted with an RF Linac accelerator at 10-13 MV. The repetition rate of the pulsed beam was varied between 8 and 120 Hz, the average beam current was varied between 8 and 120 microamps, and the power was varied up to 1.5 kW. These beam parameters gave a beam power density between 0.2 to 2 kW/cm². The duration of the joining runs varied from 5 to 600 sec. Joining experiments have provided high strength between alumina - alumina and alumina - cermet joints in cylindrical geometry. These joints provided good hermetic seals. A series of tests was conducted to determine the minimum beam power and exposure time for producing, a hermetic seal.

DOE

Aluminum Oxides; Beam Currents; Ceramics; Cermets; Electron Beams; High Energy Electrons; Linear Accelerators; Soldered Joints; Temperature Control; Thermal Conductivity

19980002542 Sandia National Labs., Albuquerque, NM USA

Fundamentals of sol-gel film deposition

Brinker, C. J., Sandia National Labs., USA; Anderson, M. T., Sandia National Labs., USA; Bohuszewicz, T., Sandia National Labs., USA; Ganguli, R., New Mexico Univ., USA; Lu, Y., New Mexico Univ., USA; Lu, M., New Mexico Univ., USA; [1996]; 15p; In English; Meeting of the Industrial Advisory Board/Center for Microengineering Materials of the University of New Mexico, 24 Sep. 1996, Albuquerque, NM, USA

Contract(s)/Grant(s): DE-AC04-94AL-85000

Report No.(s): SAND-96-2647C; CONF-9609303-1; DE97-000890; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Results appear to confirm the concept of surfactant-templating of thin film mesostructures. Final film pore structure depends on starting surfactant and water concentrations and process time scale (governed by evaporation rate). Surfactant ordering at substrate-film and film-vapor interfaces orients the porosity of adjoining films, leading to graded structures. SAW experiments show that depending on processing conditions, the porosity may be open or closed (restricted). Open porosity is monosized. Upon pyrolysis, lamellar structures collapse, while the hexagonal structures persist; when both hexagonal and lamellar structures are present, the hexagonal may serve to pillar the lamellar, avoiding its complete collapse. Thick lamellar films can be prepared because the surfactant mechanically decouples stress development in adjoining layers. Upon drying and heating, each individual layer can shrink due to continuing condensation reactions without accumulating stress. During surfactant pyrolysis, the layers coalesce to form a thick crack-free layer. Formation of closed porosity films is discussed.

DOE

Sol-Gel Processes; Evaporation Rate; Collapse; Condensing; Surfactants

19980002550 Sandia National Labs., Albuquerque, NM USA

O-17 NMR investigations of oxidative degradation in polymers

Alam, T. M., Sandia National Labs., USA; Celina, M., Sandia National Labs., USA; Assink, R. A., Sandia National Labs., USA; Gillen, K. T., Sandia National Labs., USA; Clough, R. L., Sandia National Labs., USA; [1996]; 2p; In English; 213th; National Meeting of the American Chemical Society, 13-17 Apr. 1997, San Francisco, CA, USA

Contract(s)/Grant(s): DE-AC04-94AL-85000

Report No.(s): SAND-96-2776C; CONF-970443-6; DE97-000919; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

We have initiated studies using both solution and solid state magic angle spinning (sup 17)O NMR for a series of oxidatively aged polymers. This short note reports the solution (sup 17)O NMR for oxidatively degraded polypropylene, ethylene-propylene-diene, polyisoprene, and nitrile rubber. Enriched O(sub 2) is used during the accelerated aging.

DOE

Nuclear Magnetic Resonance; Accelerated Life Tests; Oxygen 17; Polyisoprenes; Synthetic Rubbers

19980002574 Morris Brown Coll., Center of Excellence for Research on Training, Atlanta, GA USA

Polymer Research Initiation for Faculty from HBCUs Final Report

Bota, Kofi B., Morris Brown Coll., USA; Jan. 1993; 3p; In English

Contract(s)/Grant(s): N00014-88- J-1170

Report No.(s): AD-A324194; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

The research involved the synthesis and characterization of bicyclooctylene analogs of aramids and processable polymeric precursors to aramids. The project were also introduced to polymer characterization techniques, such as, optical polarizing microscopy, thermal analysis (differential scanning calorimetry and thermogravimetric analysis), Fourier transform nuclear magnetic resonance and infrared spectroscopy, and X-ray diffraction.

DTIC

Nuclear Magnetic Resonance; X Ray Diffraction; Thermogravimetry; Fourier Transformation

19980002591 NERAC, Inc., Tolland, CT USA

Processing of PZT Ceramics: Latest citations from Ceramic Abstracts Database

Feb. 1997; In English

Report No.(s): PB97-855613; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the processing of lead zirconate titanate (PZT) ceramics. Methods of fabrication include rapid thermal processing, sol-gel processing, coprecipitation, and hydrothermal precipitation. Also examined are the effects of these processes on properties of the PZT ceramics including microstructure, density, shrinkage, and dielectric constant. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Lead Zirconate Titanates; Ceramics; Fabrication

19980002597 NERAC, Inc., Tolland, CT USA

Aerogels: Preparation, Characterization, and Applications. Latest Citations from the INSPEC Database

Jan. 1997; In English

Report No.(s): PB97-854343; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the preparation, characterization, properties, and applications of aerogel materials, with particular emphasis on silica aerogels. Citations discuss aerogel formation, structural modeling, vibration characterizations, and dielectric properties. Applications of aerogels include use in Cherenkov counters, insulating materials, and porous matrices and supports, and use as precursor materials for production of glasses and sintered solids.(Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Aerogels; Silica Gel

19980002731 Wisconsin Dept. of Transportation, Madison, WI USA

Great Unsealing: A Perspective on PCC Joint Sealing

Shober, Stephen F., Wisconsin Dept. of Transportation, USA; Apr. 1997; 32p; In English

Report No.(s): PB97-161350; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The Wisconsin Department of Transportation (WisDOT) has been studying the effect of Portland Cement Concrete (PCC) joint/crack sealing on total pavement performance for 50 years. by 1967 there was substantial documentation that filling and refilling of contraction joints had no beneficial effect on pavement performance. by 1984, it was concluded that pavements with unsealed joints had better overall performance (distress, ride, materials integrity) than pavements with sealed joints. In 1990, WisDOT passed a policy eliminating all PCC joint sealing (in new construction and maintenance). This 'no-seal' policy has saved Wisconsin \$6,000,000 annually with no loss in pavement performance and with increased customer safety and convenience. The

entire PCC sealing issue is beginning to be addressed at the national level, assuring no false assumptions, and the the customer's needs in view.

NTIS

Cracks; Sealing; Concrete Structures; Pavements; Sealers

19980002750 Lawrence Livermore National Lab., Livermore, CA USA

Effect of electric field distribution on the morphologies of laser-induced damage in hafnia-silica multilayer polarizers

Genin, F. Y., Lawrence Livermore National Lab., USA; Stolz, C. J., Lawrence Livermore National Lab., USA; Reitter, T., Lawrence Livermore National Lab., USA; Kozlowski, M. R., Lawrence Livermore National Lab., USA; Bevis, R. P., Spectra-Physics Lasers, Inc., USA; vonGuntten, M. K., Spectra-Physics Lasers, Inc., USA; Jan. 1997; 14p; In English; 28th; Optical Materials for High Power Lasers - Boulder Damage, 7-9 Oct. 1996, Boulder, CO, USA

Contract(s)/Grant(s): W-7405-eng-48

Report No.(s): UCRL-JC-124873; CONF-961070-8; DE97-051815; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

Hafnia-silica multilayer polarizers were deposited by e-beam evaporation onto BK7 glass substrates. The polarizers were designed to operate at 1064 nm at Brewster's angle (56(degree)). They were tested with a 3-ns laser pulse at 45, 56, and 65(degree) incidence angle in order to vary the electric field distribution in the multilayer, study their effects on damage morphology, and investigate possible advantages of off-use angle laser conditioning. Morphology of the laser-induced damage was characterized by optical and scanning electron microscopy. Four distinct damage morphologies (pit, flat bottom pit, scald, outer layer delamination) were observed; they depend strongly on incident angle of the laser beam. Massive delamination observed at 45 and 56(degree) incidence, did not occur at 65(degree); instead, large and deep pits were found at 65(degree). Electric field distribution, temperature rise, and change in stress in the multilayer were calculated to attempt to better understand the relation between damage morphology, electric field peak locations, and maximum thermal stress gradients. The calculations showed a twofold increase in stress change in the hafnia top layers depending on incident angle. Stress gradient in the first hafnia-silica interface was found to be highest for 45, 56, and 65(degree), respectively. Finally, the maximum stress was deeper in the multilayer at 65(degree). Although the limitations of such simple thermal mechanical model are obvious, the results can explain that outer layer delamination is more likely at 45 and 56(degree) than 65(degree) and that damage sites are expected to be deeper at 65(degree).

DOE

Scanning Electron Microscopy; Pulsed Lasers; Optical Scanners; Morphology; Laser Beams; Electron Beams; Electric Fields

19980002762 Argonne National Lab., IL USA

High-temperature magnetic anomalies in SR-doped La manganite structures

Potter, C. D., Argonne National Lab., USA; Swiatek, M., Argonne National Lab., USA; Mitchell, J. F., Argonne National Lab., USA; Hinks, D. G., Argonne National Lab., USA; Jorgensen, J. D., Argonne National Lab., USA; Bader, S. D., Argonne National Lab., USA; Argyriou, D. N., Argonne National Lab., USA; [1996]; 16p; In English; 41st; Annual Conference on Magnetism and Magnetic Materials, 12-15 Nov. 1996, Atlanta, GA, USA

Contract(s)/Grant(s): W-31-109-eng-38; NSF DMR-91-20000

Report No.(s): ANL/MSD/CP-90207; CONF-961141-10; DE97-003887; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The temperature dependence of the magnetization M, susceptibility (χ), and magnetoresistance MR for 3 perovskite-variant manganite structures were studied: monoclinic ($x=0.075$) and orthorhombic ($x=0.125$) $\text{La}_{1-x}\text{Sr}_x\text{MnO}_3$, and tetragonal layered $\text{La}_{2-2x}\text{Sr}_{1+2x}\text{Mn}_2\text{O}_7$ ($x=0.4$) with x also indicating the nominal fraction of Mn^{4+} . In each case, evidence is found for unusual magnetic states at temperatures T above their primary magnetic transitions. In the first case, the high- T (χ) deviates from Curie-Weiss expectations, in the second case the MR extends to high T , and in the last, M and (χ) exhibit short-range anomalies at high T . This suggests that a key feature of these systems is the existence of multiple magnetic energy scales, independent of structure, dimensionality, or doping levels.

DOE

Magnetoresistivity; High Temperature; Additives; Anomalies

19980002774 NERAC, Inc., Tolland, CT USA

Processing of Sialon. (Latest citations from Ceramic Abstracts Database)

Feb. 1997; In English; Page count unavailable. Supersedes PB96-864913

Report No.(s): PB97-855373; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the processing of Sialon (named for its constituents Si--Al--O--N). Citations include discussions about the preparation, formation, and sintering of sialon ceramics. Specific methods of producing Sialon materials mentioned are combustion synthesis and gas-pressure sintering. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Sialon; Ceramics

19980002793 NERAC, Inc., Tolland, CT USA

Antifouling Coatings for Marine Environments: Latest citations from the Energy Science and Technology Database

Aug. 1996; In English; Page Count Unavailable

Report No.(s): PB96-873039; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)); US Sales Only, Microfiche

The bibliography contains citations concerning antifouling and anticorrosive materials and methods for the protection of facilities and structures in marine environments. Antifouling coatings, paints, claddings, and cathodes are reviewed. References include biological fouling of steels and metals, bacterial biofilm formation, antifoulant testing, toxicity testing of antifouling materials, and environmental assessment of thermal power plants. Cathodic protection of ships and offshore facilities is examined.

NTIS

Protective Coatings; Marine Environments; Energy Technology; Cathodic Coatings

19980002837 NERAC, Inc., Tolland, CT USA

Ceramic to Metal Joining: Latest citations from Engineered Materials Abstracts

Sep. 1996; In English; Page Count Unavailable

Report No.(s): PB96-873310; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the technology of joining ceramic to metal materials. Articles discuss techniques such as ultrasonic welding, brazing, soldering, metallizing, activated coatings, hot pressing, plasma spraying, friction welding, and diffusion welding. Citations address the microstructure, chemistry, and thermodynamics of ceramic-to-metal interfaces to assess and enhance adhesion between the differing materials. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Metal Bonding; Ceramics; Thermodynamics; Microstructure

19980002838 NERAC, Inc., Tolland, CT USA

Diamond-Like Carbon Films: Latest citations from the Ei Compendex*Plus Database

Aug. 1996; In English; Page Count Unavailable

Report No.(s): PB96-873237; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning techniques and equipment used in the deposition of diamond-like carbon films on a variety of substrates. Topics include descriptions and evaluations of deposition methods, film characterizations and evaluations, the use of hydrocarbon gases for producing carbon films, amorphous carbon films, and annealing effects on properties of carbon films. Applications include coatings on optical materials, semiconductor devices, communication cables, optical devices, tools, and bearings. Optical, electrical, and structural properties of diamond-like carbon films in military electronics and space power components are included.

NTIS

Annealing; Diamond Films; Amorphous Materials; Electrical Properties; Optical Equipment; Optical Properties; Semiconductor Devices

19980002843 NERAC, Inc., Tolland, CT USA

Fire Retarding Coatings: Latest citations from World Surface Coatings Abstracts

Aug. 1996; In English; Page Count Unavailable

Report No.(s): PB96-873005; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning flame retardant coatings. Citations reference selected patents, chemical composition, surface preparations, applications, performance tests, and testing devices. Applications include use on wallpaper; elec-

tric wire and cable; cement based and hot-melt adhesive coatings; foaming fire retardants; and coatings for insulation, paint, putty, wood, and steel.

NTIS

Chemical Composition; Flame Retardants; Electric Wire; Adhesives

19980002887 NERAC, Inc., Tolland, CT USA

Molding Thermosetting and Thermoplastic Structural Foam: Latest citations from the Ei Compendex*Plus Database

Sep. 1996; In English; Page Count Unavailable

Report No.(s): PB96-873328; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning syntactic and structural foam molding machinery and processes. Citations discuss gas counter pressure, low pressure, and low density structural foam molding techniques. Topics include effects of processing conditions on molded products, high impact polystyrene, mold release agents, reaction injection molding, and low density foamed plastics. Applications in automobile industry are covered. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Foams; Automobiles; Plastics; Injection Molding

19980002912 Oklahoma Dept. of Transportation, Research, Development and Technology Transfer, Oklahoma City, OK USA

Omni-Flex Pipe Joint Seals Final Report, Jul. 1991 - Oct. 1995

Williams, Gary G., Oklahoma Dept. of Transportation, USA; Dec. 1996; 28p; In English

Report No.(s): PB97-155469; No Copyright; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

In June, 1991 The Oklahoma Department of Transportation (ODOT) had 16 Omni-Flex pipe joint seals installed in the joints of a reinforced concrete pipe (RCP) section on ODOT Project ACIR-44-2(326)233 in Tulsa. Individual sections of RCP had diameters of 1.5 m (60 in) and lengths of 2.4 m (8 ft) in the area where the seals were installed. The remainder of the joints between RCP sections on this project were sealed with mastic. Mastic is approved for use on ODOT projects, and is widely used in Oklahoma. The 16 joints sealed with Omni-Flex seals, and an adjacent 16 joints of the same size RCP, sealed with Mastic, have been monitored since project completion. Monitoring consisted of inspecting the joints from inside the pipe. Neither section has shown any unusual amounts of leakage or other deterioration which could be considered to be related to performance of the joint seals.

NTIS

Pipes (Tubes); Composite Materials; Seals (Stoppers); Concretes; Pipelines

19980002939 NERAC, Inc., Tolland, CT USA

Synthetic Lubricants: Latest citations from the NTIS Bibliographic Database

Aug. 1996; In English; Page Count Unavailable

Report No.(s): PB96-873138; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development, manufacture, and performance of synthetic lubricants. High temperature lubricants, additives, lubricity data, toxicity, and thermal decomposition of lubricants are discussed. References cover applications in diesel engines, gas turbines, and bearing and hydraulic systems.

NTIS

Thermal Decomposition; High Temperature Lubricants; Additives; Hydraulic Equipment; Lubricants; Gas Turbines

19980002940 NERAC, Inc., Tolland, CT USA

Use of Ceramics in Engine Components: Latest citations from Ceramic Abstracts Database

Aug. 1996; In English; Page Count Unavailable, Supersedes PB95-860326

Report No.(s): PB96-873112; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning manufacturing processes, testing, design, and stress analysis of ceramic engine parts and coatings. Topics include slip casting, reaction sintering, hot isostatic pressing, injection molding, and plasma spraying processes. The citations also consider advantages of using ceramic engine components in automotive, military, and aircraft applications.

NTIS

Ceramics; Injection Molding; Stress Analysis; Slip Casting; Plasma Spraying; Manufacturing

19980003296 Ohio State Univ., Dept. of Physics, Columbus, OH USA

Intrinsically Trapped Triplet Excitons in pi-Conjugated Polymers

Partee, J., Ohio State Univ., USA; Shinar, J., Ohio State Univ., USA; Jessen, S. W., Ohio State Univ., USA; Epstein, A. J., Ohio State Univ., USA; Graupner, W., Ohio State Univ., USA; Sep. 20, 1997; 16p; In English

Contract(s)/Grant(s): N00014-95-I-0302

Report No.(s): AD-A330211; TR-P307; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The X-band spin 1 photoluminescence-detected magnetic resonance of frozen toluene solutions of poly (p-phenylene ethynylene) (PPE) and poly (p-phenylene)-type ladder (LPPP) polymers are presented. The amplitude of the 800-1100 G wide triplet resonance pattern decreases with decreasing concentration of PPE in toluene and tetrahydrofuran; in frozen saturated solutions of LPPP it is about half of that in neat films. The results suggest the resonance is largely due to a long-lived (30 microsecs) trapped triplet exciton state localized on a phenylene ring and stabilized by coupling to a segment of an adjacent chain. The role of this trapped triplet in the photophysics of pi-conjugated polymers is discussed.

DTIC

Polymers; Photoluminescence; Trapping; Magnetic Resonance

19980003330 NASA Ames Research Center, Moffett Field, CA USA

Low-Density Resin Impregnated Ceramic Article and Method for Making the Same

Tran, Huy K., Inventor, NASA Ames Research Center, USA; Henline, William D., Inventor, NASA Ames Research Center, USA; Hsu, Ming-Ta S., Inventor, NASA Ames Research Center, USA; Rasky, Daniel J., Inventor, NASA Ames Research Center, USA; Riccitiello, Salvatore R., Inventor, NASA Ames Research Center, USA; Sep. 30, 1997; 13p; In English; Division of US-Patent-Appl-SN-212640, filed 14 Mar. 1994

Patent Info.: Filed 8 Jun. 1995; NASA-Case-ARC-12011-2; US-Patent-Appl-SN-523726; US-Patent-Appl-SN-212640; No Copyright; Avail: US Patent and Trademark Office, Hardcopy, Microfiche

A low-density resin impregnated ceramic article advantageously employed as a structural ceramic ablator comprising a matrix of ceramic fibers. The fibers of the ceramic matrix are coated with an organic resin film. The organic resin can be a thermoplastic resin or a cured thermosetting resin. In one embodiment, the resin is uniformly distributed within the ceramic article. In a second embodiment, the resin is distributed so as to provide a density gradient along at least one direction of the ceramic article. The resin impregnated ceramic article is prepared by providing a matrix of ceramic fibers; immersing the matrix of ceramic fibers in a solution of a solvent and an organic resin infiltrant; and removing the solvent to form a resin film on the ceramic fibers.

Official Gazette of the U.S. Patent and Trademark

Low Density Materials; Resins; Ceramics; Ceramic Matrix Composites

19980003399 NERAC, Inc., Tolland, CT USA

Polymer Alloys: Applications and Market Trends. (Latest citations from the Rubber and Plastics Research Association Database)

Feb. 1997; In English; Page count unavailable. Supersedes PB96-865399

Report No.(s): PB97-855449; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development of polymer alloys by mixing several distinct polymers. These compositions are widely used in automotive, electronics, sports, and leisure goods. The blending of specific polymers, which form a chemical bond between the phases and exhibit properties such as strength, wear, flame and chemical resistance, is discussed. Analyses of the polymer alloy market, and evolving trends, are included. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Plastics; Polymer Blends; Rubber

19980003412 NERAC, Inc., Tolland, CT USA

Photochromic Polymers. (Latest citations from the Rubber and Plastics Research Association Database)

Jan. 1997; In English; Page count unavailable. Supersedes PB96-861984

Report No.(s): PB97-854954; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning synthesis, properties, and reactions of photochromic polymers. Radiation and thermal effects on photochromic properties of polymers are discussed. The uses of photochromic materials in eyeglasses, spec-

tacle lenses, photographic optics, and laser optics are described.(Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Photochromism; Polymers

19980003436 NERAC, Inc., Tolland, CT USA

Silicon Layers and Films. (Latest citations from the U.S. Patent Bibliographic File with Exemplary Claims)

Sep. 1996; In English; Page count unavailable.

Report No.(s): PB96-873534; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning the deposition of silicon layers and films on a variety of substrates. The design and fabrication of silicon nitride, carbide, oxide, and dioxide layers and films are presented. Topics include ion implantation and doping, fluorination, etching, moisture and contaminant barriers, and impurity diffusion prevention. References cover applications in the manufacture of semiconductor devices and light emitting devices. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Silicon Films; Fabrication; Deposition

19980003773 NERAC, Inc., Tolland, CT USA

Recycling Plastics and Polymeric Wastes (Latest citations from the Ei Compendex*Plus Database)

Nov. 1996; In English; Page count unavailable

Report No.(s): PB97-851547; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the recycling and uses of plastic and polymeric scraps and wastes. Topics include comminution or grinding of scrap, degradation by heat or chemical reaction, compatibility of various plastics with one another, sorting problems, physical properties of reprocessed materials, economics, public awareness, waste minimization, waste re-use, and foreign experience in plastics recycling. New products made from recycled materials, and products expressly made to be recyclable are also discussed. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Recycling; Plastics; Bibliographies; Polymers; Waste Treatment

19980003775 NERAC, Inc., Tolland, CT USA

Chemical Vapor Deposited Diamond Coatings (Latest citations from the INSPEC Database)

Nov. 1996; In English; Page count unavailable

Report No.(s): PB97-851596; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning properties, characteristics, and tests of diamond films prepared by chemical vapor deposition (CVD) technology. Topics include CVD coatings, low pressure diamond growth, in-situ doping, electronic microstructures, hydrogen-related defects and impurities, and thermal stress cracking. References examine applications in the manufacture of semiconductor thin films, diamond devices, cutting tools, high-power lasers, photodetectors, and radiation detectors. Smoothing, thinning, shaping, and surface modification of diamond films are also referenced. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Vapor Deposition; Diamond Films; Coatings

19980003786 NERAC, Inc., Tolland, CT USA

Cultured Marble and Other Simulated Stones. (Latest citations from the Rubber and Plastics Research Association Database)

Nov. 1996; In English; Page count unavailable. Supersedes PB96-863188.

Report No.(s): PB97-852131; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning compositions, applications, and manufacturing processes for synthetic rocks. Mold making, mixing equipment, injection molding machines, and extruders are discussed. Fillers used include microballoons, chopped strand, buffing dust from sport shoe soles, calcium carbonate, glass powder, granite, and silica.

NTIS

Bibliographies; Rocks; Manufacturing; Injection Molding; Silicon Dioxide; Calcium Carbonates; Granite

19980003790 NERAC, Inc., Tolland, CT USA

Electrically Conductive and Insulative Adhesives (Latest citations from the US Patent Bibliographic File with Exemplary Claims)

Nov. 1996; In English; Page count unavailable

Report No.(s): PB97-851331; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning manufacturing techniques and applications of electrically conductive and insulative adhesives. The uses of conductive and insulative adhesive tapes for bonding electrical conductors and devices are disclosed. Also included are patents for polymer adhesive materials and adhesive coatings on metal surfaces and electrodes.

NTIS

Bibliographies; Adhesives; Patents; Electrical Resistivity

19980003797 NERAC, Inc., Tolland, CT USA

Nonwoven Fabrics: Wet Laid Process Production and Applications. (Latest citations from World Textile Abstracts)

Nov. 1996; In English; Page count unavailable. Supersedes PB96-861695.

Report No.(s): PB97-852115; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning nonwoven fabric production using technological advances in the wet laid process. Materials properties and descriptions, raw materials analyses, and fiber entanglement techniques are described. A wide variety of materials may be used in this process, including cotton, viscose, mineral wool, glass, or synthetic polymers in plain or coated fibers. Wet laid nonwoven fabrics are used extensively as filter fabrics, medical textiles, wound dressings, roofing bases, gaskets, and industrial garments. Some international patents are included.

NTIS

Bibliographies; Fabrics; Fibers; Textiles; Garments; Coatings; Cotton

19980003813 NERAC, Inc., Tolland, CT USA

Intumescent Coatings and Paints (Latest citations from World Surface Coatings Abstracts)

Oct. 1996; In English; Page count unavailable

Report No.(s): PB97-850812; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning compositions and properties of coatings and paints containing intumescent materials. Topics include descriptions of specific compositions, patents of products and compositions, product reviews, and pyrolysis and fire tests. Applications are discussed, including use in building panels, structural steel, decorative fillings.

NTIS

Bibliographies; Paints; Coating

19980003824 NERAC, Inc., Tolland, CT USA

Abrasion-Resistant Coatings: Latest citations from World Surface Coatings Abstracts

Oct. 1996; In English; Page count unavailable, Supersedes PB96-854740.

Report No.(s): PB97-850622; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the compositions and applications of abrasion-resistant coatings. Coatings are applied to glass, plastic, wood and metal substrates. Also included are transparent coatings used on clear plastics, windshields, and furniture. References also include applications to photosensitive films.

NTIS

Bibliographies; Protective Coatings; Plastic Coatings

19980003830 NERAC, Inc., Tolland, CT USA

Recovery and Recycling of Plastic Wastes: Latest citations from Pollution Abstracts

Oct. 1996; In English; Page count unavailable, Supersedes PB96-851662.

Report No.(s): PB97-850424; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the recycling of plastics from municipal waste streams, landfills, and scrap from industrial processes. Topics include major advances in industry-led plastics recycling, equipment needed for reprocessing scrap plastic into useful materials, and markets for recycled products. The citations also discuss the types of plastics most economical to recycle and those least likely to be contaminated with toxic or carcinogenic materials which would make reprocessing hazardous. Successful recycling programs developed in Japan and western European countries are detailed.

NTIS

Bibliographies; Plastics; Recycling; Market Research; Abstracts

19980003861 NERAC, Inc., Tolland, CT USA

Ceramic Fibers as Reinforcing Material (Latest citations from the NTIS Bibliographic Database)

Oct. 1996; In English; Page count unavailable

Report No.(s): PB97-850952; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the development, manufacturing, and evaluation of ceramic fibers for use as reinforcing material. Mechanical properties, high temperature characteristics, structural stability, and thermochemical properties of ceramic fiber reinforced ceramic matrix composites and metal matrix composites are discussed. Citations also cover applications in gas turbine engines, space structures, cutting tools, optical/electronic units, and armors.

NTIS

Bibliographies; Ceramic Fibers; Composite Materials; Reinforcing Materials; Product Development; Manufacturing; Evaluation

19980003866 NERAC, Inc., Tolland, CT USA

Mineral Fillers in Plastics and Elastomers. (Latest citations from the Rubber and Plastics Research Association Database)

Nov. 1996; In English; Page count unavailable. Supersedes PB96-861539.

Report No.(s): PB97-852107; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the uses of such mineral fillers as talc, calcium carbonate, clay, wollastonite, mica, silica and boron in plastics and elastomers. Mechanical, electrical and tribological properties relative to flexural strength, abrasion resistance, heat stability, impact resistance, electrical conductivity, chemical resistance, dimensional stability and flame retardancy are considered. Effects of molding on mineral filled plastics and elastomers, and applications in electrical, electronic and automotive industries are also included.

NTIS

Plastics; Elastomers; Rubber; Calcium Carbonates; Boron; Mica; Mechanical Properties; Electrical Properties; Electrical Resistivity; Dimensional Stability

19980003869 NERAC, Inc., Tolland, CT USA

Indium Tin Oxide Films (Latest citations from the Ei Compendex*Plus Database)

Nov. 1996; In English; Page count unavailable

Report No.(s): PB97-851497; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning fabrication techniques, properties, and applications of indium-tin oxide (ITO) films. Optical, electrical, and structural properties of transparent, conductive, infrared-reflecting, and semiconducting ITO films prepared by sputtering, vapor deposition, ion plating, spraying, and hydrolysis are discussed. Applications in electrostatic problems, transparent electrodes for liquid crystal displays, solar energy conversion, and infrared reflectors and filters are presented. Some considerations are given to the effects of annealing, film thickness, and preparation methods on the properties of ITO films.

NTIS

Bibliographies; Optical Properties; Thin Films; Fabrication; Electrical Properties

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PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; their storage and handling procedures; and aircraft fuels. For related information see also 07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, and 44 Energy Production and Conversion.

19980002465 Army Research Lab., Aberdeen Proving Ground, MD USA

Reduced Chemical-Kinetic Mechanisms for the Dark Zones of Double-Base and Nitramine Gun Propellants *Final Report, Feb. 1994 - Jul. 1996*

Ilincic, N., California Univ., USA; Seshadri, K., California Univ., USA; Anderson, W. R., Army Research Lab., USA; Meagher, N. E., Army Research Lab., USA; May 1997; 38p; In English

Contract(s)/Grant(s): ARO-DAAH-95-1-0108; Proj. 1L1-61102-A-H4-3

Report No.(s): AD-A326720; ARL-TR-1352; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Simplified chemical-kinetic mechanisms were employed to calculate the structure of the dark zones of burning double-base and nitramine propellants. These reduced mechanisms are expected to be useful in interior ballistic calculations. First, skeletal mechanisms comprised of 22 elementary reactions among 15 species and 23 elementary reactions among 17 species were used to calculate dark zone structures for double-base and nitramine propellants, respectively. The skeletal mechanisms were previously extracted from a detailed mechanism incorporating 190 elementary reactions involving 41 species. Ignition delay times $\tau_{sub\ ig}$ were calculated for homogeneous mixtures in which the initial concentrations of reactants were similar to those found at the beginning of propellant dark zones. The $\tau_{sub\ ig}$ calculations were performed for various initial pressures and temperatures. The $\tau_{sub\ ig}$ calculated using the skeletal and detailed mechanisms agreed well. Reduced mechanisms were derived from the skeletal mechanisms by introducing steady-state approximations for a number of species. For double-base propellants, a reduced mechanism of three global reactions was obtained. Reduced mechanisms utilizing six and four global reactions were deduced for nitramine propellants. The $\tau_{sub\ ig}$ and structures of the dark zones calculated using the reduced three-step mechanism for double-base propellants and six-step mechanism for nitramine propellants were in agreement with calculations made using the skeletal mechanisms. Agreement using the four-step reduced mechanism for nitramine propellants was not good; however, it might still be useful for some applications.

DTIC

Double Base Propellants; Gun Propellants; Nitramine Propellants; Steady State

19980002531 NERAC, Inc., Tolland, CT USA

Solid Rocket Engine Propellants: Latest citations from the NTIS Bibliographic Database

Feb. 1997; In English

Report No.(s): PB97-855464; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the design, development, testing, and evaluations of solid propellants for rocket engines. Topics include metallized propellants, plasticizers, burning rates and enhancers, binders, propellant grains, and propellant aging and storage life. Environmental impact and protection are examined. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Solid Rocket Propellants

19980002532 NERAC, Inc., Tolland, CT USA

Shaped Charges: Latest citations from the US Patent Bibliographic File with Exemplary Claims

Feb. 1997; In English

Report No.(s): PB97-855472; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations of selected patents concerning the manufacture and use of shaped charges in a number of applications. Projectile guns and carrier assemblies, liners, detonation characteristics, and armor-piercing projectiles are among the topics discussed. The citations examine applications such as use in well casing perforation and formation fracturing. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Shaped Charges

19980003848 NERAC, Inc., Tolland, CT USA

Biodegradation of Explosives: Latest citations from the NTIS Bibliographic Database

Aug. 1996; In English; Page Count Unavailable

Report No.(s): PB96-872718; Copyright Waived; Avail: Issuing Activity (Natl Technical Information Service (NTIS)), Microfiche

The bibliography contains citations concerning the biodegradation of explosives or propellants. Mechanisms and pathways of degradation in soil or water are discussed, as well as regulations governing disposal. Bioremediation of other hazardous materials is discussed in a separate bibliography. (Contains 50-250 citations and includes a subject term index and title list.)

NTIS

Bibliographies; Biodegradation; Explosives; Propellants

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MATERIALS PROCESSING

Includes space-based development of products and processes for commercial applications. For biological materials see 55 Space Biology.

19980003840 California Univ., Dept. of Physics, Los Angeles, CA USA

Microgravity Foam Structure and Rheology Final Report, 15 Dec. 1992 - 31 Dec. 1996

Durian, Douglas J., California Univ., USA; Aug. 01, 1997; 3p; In English

Contract(s)/Grant(s): NAG3-1419

Report No.(s): NASA/CR-97-206441; NAS 1.26:206441; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

To exploit rheological and multiple-light scattering techniques, and ultimately microgravity conditions, in order to quantify and elucidate the unusual elastic character of foams in terms of their underlying microscopic structure and dynamics. Special interest is in determining how this elastic character vanishes, i.e. how the foam melts into a simple viscous liquid, as a function of both increasing liquid content and shear strain rate. The unusual elastic character of foams will be quantified macroscopically by measurement of the shear stress as a function of static shear strain, shear strain rate, and time following a step strain; such data will be analyzed in terms of a yield stress, a static shear modulus, and dynamical time scales. Microscopic information about bubble packing and rearrangement dynamics, from which these macroscopic non-Newtonian properties presumably arise, will be obtained non-invasively by novel multiple-light scattering diagnostics such as Diffusing-Wave Spectroscopy (DWS). Quantitative trends with materials parameters, such as average bubble size, and liquid content, will be sought in order to elucidate the fundamental connection between the microscopic structure and dynamics and the macroscopic rheology.

Derived from text

Microgravity; Foams; Rheology; Microstructure